UNIT TERMINAL OBJECTIVE

6-1.1 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan for a neonatal patient.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

6-1.2 Define the term newborn.(C-1)
6-1.3 Define the term neonate. (C-1)
6-1.4 Identify important antepartum factors that can affect childbirth. (C-1)
6-1.5 Identify important intrapartum factors that can term the newborn high risk. (C-1)
6-1.6 Identify the factors that lead to premature birth and low birth weight newborns. (C-1)
6-1.7 Distinguish between primary and secondary apnea. (C-3)
6-1.8 Discuss pulmonary perfusion and asphyxia. (C-1)
6-1.9 Identify the primary signs utilized for evaluating a newborn during resuscitation. (C-1)
6-1.10 Formulate an appropriate treatment plan for providing initial care to a newborn. (C-3)
6-1.11 Identify the appropriate use of the APGAR score in caring for a newborn.(C-1)
6-1.12 Calculate the APGAR score given various newborn situations. (C-3)
6-1.13 Determine when ventilatory assistance is appropriate for a newborn. (C-1)
6-1.14 Prepare appropriate ventilation equipment, adjuncts and technique for a newborn. (C-1)
6-1.15 Determine when chest compressions are appropriate for a newborn. (C-1)
6-1.16 Discuss appropriate chest compression techniques for a newborn. (C-1)
6-1.17 Assess patient improvement due to chest compressions and ventilations. (C-1)
6-1.18 Determine when endotracheal intubation is appropriate for a newborn. (C-1)
6-1.19 Discuss appropriate endotracheal intubation techniques for a newborn. (C-1)
6-1.20 Assess patient improvement due to endotracheal intubation. (C-1)
6-1.21 Identify complications related to endotracheal intubation for a newborn. (C-1)
6-1.22 Determine when vascular access is indicated for a newborn. (C-1)
6-1.23 Discuss the routes of medication administration for a newborn. (C-1)
6-1.24 Determine when blow-by oxygen delivery is appropriate for a newborn. (C-1)
6-1.25 Discuss appropriate blow-by oxygen delivery devices and technique for a newborn. (C-1)
6-1.26 Assess patient improvement due to assisted ventilations. (C-1)
6-1.27 Determine when an orogastric tube should be inserted during positive-pressure ventilation. (C-1)
6-1.28 Discuss the signs of hypovolemia in a newborn. (C-1)
6-1.29 Discuss the initial steps in resuscitation of a newborn. (C-1)
6-1.30 Assess patient improvement due to blow-by oxygen delivery. (C-1)
6-1.31 Discuss the effects maternal narcotic usage has on the newborn. (C-1)
6-1.32 Determine the appropriate treatment for the newborn with narcotic depression. (C-1)
6-1.33 Discuss appropriate transport guidelines for a newborn. (C-1)
6-1.34 Determine appropriate receiving facilities for low and high risk newborns. (C-1)
6-1.35 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for meconium aspiration. (C-1)
6-1.36 Discuss the pathophysiology of meconium aspiration. (C-1)
6-1.37 Discuss the assessment findings associated with meconium aspiration. (C-1)
6-1.38 Discuss the management/ treatment plan for meconium aspiration. (C-1)
6-1.39 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for apnea in the neonate. (C-1)
6-1.40 Discuss the pathophysiology of apnea in the neonate. (C-1)
6-1.41 Discuss the assessment findings associated with apnea in the neonate. (C-1)

6-1.42 Discuss the management/ treatment plan for apnea in the neonate. (C-1)
6-1.43 Describe the epidemiology, pathophysiology, assessment findings, management/ treatment plan for diaphragmatic hernia. (C-1)
6-1.44 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for bradycardia in the neonate. (C-1)
6-1.45 Discuss the pathophysiology of bradycardia in the neonate. (C-1)
6-1.46 Discuss the assessment findings associated with bradycardia in the neonate. (C-1)
6-1.47 Discuss the management/ treatment plan for bradycardia in the neonate. (C-1)
6-1.48 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for premature infants
6-1.49 Discuss the pathophysiology of premature infants. (C-1)
6-1.50 Discuss the assessment findings associated with premature infants. (C-1)
6-1.51 Discuss the management/ treatment plan for premature infants. (C-1)
6-1.52 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for respiratory distress/ cyanosis in the neonate. (C-1)
6-1.53 Discuss the pathophysiology of respiratory distress/ cyanosis in the neonate. (C-1)
6-1.54 Discuss the assessment findings associated with respiratory distress/ cyanosis in the neonate. (C-1)
6-1.55 Discuss the management/ treatment plan for respiratory distress/ cyanosis in the neonate.(C-1)
6-1.56 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for seizures in the neonate. (C-1)
6-1.57 Discuss the pathophysiology of seizures in the neonate. (C-1)
6-1.58 Discuss the assessment findings associated with seizures in the neonate. (C-1)
6-1.59 Discuss the management/ treatment plan for seizures in the neonate. (C-1)
6-1.60 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for fever in the neonate. (C-1)
6-1.61 Discuss the pathophysiology of fever in the neonate. (C-1)
6-1.62 Discuss the assessment findings associated with fever in the neonate. (C-1)
6-1.63 Discuss the management/ treatment plan for fever in the neonate. (C-1)
6-1.64 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for hypothermia in the neonate. (C-1)
6-1.65 Discuss the pathophysiology of hypothermia in the neonate. (C-1)
6-1.66 Discuss the assessment findings associated with hypothermia in the neonate. (C-1)
6-1.67 Discuss the management/ treatment plan for hypothermia in the neonate. (C-1)
6-1.68 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for hypoglycemia in the neonate. (C-1)
6-1.69 Discuss the pathophysiology of hypoglycemia in the neonate. (C-1)
6-1.70 Discuss the assessment findings associated with hypoglycemia in the neonate. (C-1)
6-1.71 Discuss the management/ treatment plan for hypoglycemia in the neonate. (C-1)
6-1.72 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for vomiting in the neonate (C-1)
6-1.73 Discuss the pathophysiology of vomiting in the neonate. (C-1)
6-1.74 Discuss the assessment findings associated with vomiting in the neonate. (C-1)
6-1.75 Discuss the management/ treatment plan for vomiting in the neonate. (C-1)
6-1.76 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for diarrhea in the neonate. (C-1)
6-1.77 Discuss the pathophysiology of in diarrhea the neonate. (C-1)
6-1.78 Discuss the assessment findings associated with diarrhea in the neonate. (C-1)
6-1.79 Discuss the management/ treatment plan for diarrhea in the neonate. (C-1)

6-1.80 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for common birth injuries in the neonate. (C-1)
6-1.81 Discuss the pathophysiology of common birth injuries in the neonate. (C-1)
6-1.82 Discuss the assessment findings associated with common birth injuries in the neonate. (C-1)
6-1.83 Discuss the management/ treatment plan for common birth injuries in the neonate. (C-1)
6-1.84 Describe the epidemiology, including the incidence, morbidity/ mortality and risk factors for cardiac arrest in the neonate. (C-1)
6-1.85 Discuss the pathophysiology of cardiac arrest in the neonate. (C-1)
6-1.86 Discuss the assessment findings associated with cardiac arrest in the neonate. (C-1)
6-1.87 Discuss the management/ treatment plan for cardiac arrest in the neonate. (C-1)
6-1.88 Discuss the pathophysiology of post arrest management of the neonate. (C-1)
6-1.89 Discuss the assessment findings associated with post arrest situations in the neonate. (C-1)
6-1.90 Discuss the management/ treatment plan to stabilize the post arrest neonate. (C-1)

AFFECTIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

6-1.91 Demonstrate and advocate appropriate interaction with a newborn/ neonate that conveys respect for their position in life. (A-3)
6-1.92 Recognize the emotional impact of newborn/ neonate injuries/ illnesses on parents/ guardians. (A-1)
6-1.93 Recognize and appreciate the physical and emotional difficulties associated with separation of the parent/ guardian and a newborn/ neonate. (A-3)
6-1.94 Listen to the concerns expressed by parents/ guardians. (A-1)
6-1.95 Attend to the need for reassurance, empathy and compassion for the parent/ guardian. (A-1)

PSYCHOMOTOR OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

6-1.96 Demonstrate preparation of a newborn resuscitation area. (P-2)
6-1.97 Demonstrate appropriate assessment technique for examining a newborn. (P-2)
6-1.98 Demonstrate appropriate assisted ventilations for a newborn. (P-2)
6-1.99 Demonstrate appropriate endotracheal intubation technique for a newborn. (P-2)
6-1.100 Demonstrate appropriate meconium aspiration suctioning technique for a newborn. (P-2)
6-1.101 Demonstrate appropriate insertion of an orogastric tube. (P-2)
6-1.102 Demonstrate needle chest decompression for a newborn or neonate. (P-2)
6-1.103 Demonstrate appropriate chest compression and ventilation technique for a newborn. (P-2)
6-1.104 Demonstrate appropriate techniques to improve or eliminate endotracheal intubation complications. (P-2)
6-1.105 Demonstrate vascular access cannulation techniques for a newborn. (P-2)
6-1.106 Demonstrate the initial steps in resuscitation of a newborn. (P-2)
6-1.107 Demonstrate blow-by oxygen delivery for a newborn. (P-2)

DECLARATIVE

I. Introduction
- **A. Newborn**
  - **1. A recently born infant; usually considered the first few hours of life**
- **B. Neonate**
  - **1. Considered the first 28 days of life**

II. General pathophysiology, assessment and management
- **A. Epidemiology**
  - **1. Incidence**
    - **a. Approximately 6% of deliveries require life support**
    - **b. Incidence of complications increases as birth weight decreases**
  - **2. Morbidity/ mortality**
    - **a. Neonatal mortality risk can be determined via graphs based on birth weight and gestational age**
    - **b. Resuscitation is required for about 80% of the 30,000 babies who weigh less than 1500 grams at birth**
  - **3. Risk factors**
    - **a. Antepartum factors**
      - **(1) Multiple gestation**
      - **(2) Inadequate prenatal care**
      - **(3) Mother's age <16 or >35**
      - **(4) History of perinatal morbidity or mortality**
      - **(5) Post-term gestation**
      - **(6) Drugs/ medications**
      - **(7) Toxemia, hypertension, diabetes**
    - **b. Intrapartum factors**
      - **(1) Premature labor**
      - **(2) Meconium-stained amniotic fluid**
      - **(3) Rupture of membranes greater than 24 hours prior to delivery**
      - **(4) Use of narcotics within four hours of delivery**
      - **(5) Abnormal presentation**
      - **(6) Prolonged labor or precipitous delivery**
      - **(7) Prolapsed cord**
      - **(8) Bleeding**
  - **4. Treatment strategies**
    - **a. Preparation of resuscitation equipment**
    - **b. Determine appropriate destination**
- **B. Pathophysiology**
  - **1. Transition from fetal to neonatal circulation**
  - **2. Respiratory system must suddenly initiate and maintain oxygenation**
  - **3. Infants are very sensitive to hypoxia**
  - **4. Permanent brain damage will occur with hypoxemia**
  - **5. Apnea in newborns**
  - **6. Congenital anomalies**
    - **a. Diaphragmatic hernia**
    - **b. Choanal atresia**
    - **c. Pierre Robin Syndrome**
    - **d. Cleft lip**

- **e. Exposed abdominal contents**

C. Assessment

- **1. Time of delivery**
- **2. Normal/ abnormal vital signs**
- **3. Airway and ventilation**
  - **a. Respiratory rate**
  - **b. Respiratory effort**
- **4. Circulation**
  - **a. Heart rate**
    - **(1) Normal**
  - **b. Color/ cyanosis**
    - **(1) Normal**
    - **(2) Central versus peripheral**
    - **(3) Mucosal membranes**
  - **c. End organ perfusion**
    - **(1) Compare strength of central pulses versus peripheral**
    - **(2) Capillary refill**
- **5. APGAR**
  - **a. Appearance - skin color**
    - **(1) Completely pink - 2**
    - **(2) Body pink, extremities blue - 1**
    - **(3) Blue, pale - 0**
  - **b. Pulse rate**
    - **(1) Above 100 - 2**
    - **(2) Below 100 - 1**
    - **(3) Absent - 0**
  - **c. Grimace - irritability**
    - **(1) Cries - 2**
    - **(2) Grimaces - 1**
    - **(3) No response - 0**
  - **d. Activity - muscle tone**
    - **(1) Active motion - 2**
    - **(2) Some flexion of extremities - 1**
    - **(3) Limp - 0**
  - **e. Respiratory - effort**
    - **(1) Strong cry - 2**
    - **(2) Slow and irregular - 1**
    - **(3) Absent - 0**

D. Treatment

- **1. Prior to delivery, prepare environment and equipment**
- **2. During delivery, suction mouth and nose as head delivers**
- **3. After delivery**
  - **a. Airway and ventilation**
    - **(1) Drying**
      - **(a) Head and face**
      - **(b) Body**
    - **(2) Warming**
      - **(a) Appropriate techniques**
    - **(3) Position**

- **(4) Suction**
  - **(a) Technique**
    - **i) Mouth first, than nares**
    - **ii) Nasal suctioning is a stimulus to breathe**
  - **(b) Equipment**
    - **i) Bulb suction**
    - **ii) Suction catheters**
    - **iii) Meconium aspirator**
- **(5) Stimulation**
  - **(a) Flicking soles of feet**
  - **(b) Stroking back**
- **(6) Blow-by oxygen**
  - **(a) Never withhold oxygen**
  - **(b) Oxygen should be warmed**
  - **(c) Use when**
    - **i) Newborn is cyanotic and**
    - **ii) Heart rate > 100 and**
    - **iii) Adequate respiratory rate and effort**
  - **(d) 5 liters/ minute maximum**
    - **i) Complications due to hypothermia**
  - **(e) Appropriate techniques**
- **(7) Oral airways - rarely used for neonates**
  - **(a) Necessary to keep mouth open for ventilation**
  - **(b) Bilateral choanal atresia**
  - **(c) Pierre Robin Syndrome**
- **(8) Bag-valve-mask**
  - **(a) Mask characteristics**
    - **i) Appropriate size**
    - **ii) Minimize dead-space**
  - **(b) Bag characteristics**
    - **i) Pop-off valve should be disabled**
  - **(c) Use when**
    - **i) Apneic**
    - **ii) Inadequate respiratory rate or effort**
    - **iii) Heart rate less than 100**
  - **(d) Technique**
    - **i) Initial ventilations require higher pressure to expand lungs**
- **(9) Intubation**
  - **(a) Indications**
    - **i) Prolonged positive pressure ventilation**
    - **ii) Bag and mask ventilations ineffective**
    - **iii) Tracheal suctioning required**
    - **iv) Diaphragmatic hernia suspected**
  - **(b) Technique**
    - **i) Equipment**
      - **a) Suction equipment**
      - **b) Laryngoscope**
      - **c) Blades-straight**
        - **#1- full term**

- #0- preterm
- d) Endotracheal tubes
- 2.5 to 4.0 mm ID
- e) Shoulder roll
- f) Adhesive tape

(c) Confirmation
- i) Visualization
  - a) Tube passing through the cords
    - Vocal cord guide should stop at the level of the cords
  - b) Chest expansion with ventilation
- ii) Auscultation
  - a) Laterally and high on the chest wall
  - b) Epigastric region
- iii) Patient improvement

(d) PEEP

(10) Gastric decompression
- (a) Abdominal distention is impeding ventilation
- (b) Presence of diaphragmatic hernia

b. Circulation

(1) Vascular access
- (a) Indications
  - i) To administer fluids
  - ii) To administer medications
- (b) Peripheral vein cannulation
- (c) Umbilical vein cannulation
- (d) Intraosseous cannulation

(2) Chest compression (in addition to assisted ventilation with BVM)
- (a) Indications
  - i) Heart rate less than 60
  - ii) Heart rate between 60 and 80 and not increasing with adequate oxygenation
- (b) Technique
  - i) Two finger technique
  - ii) Thumb technique
- (c) Rate
  - i) 120 per minute
- (d) Depth
  - i) 1/2 - 3/4 inches
- (e) Compression-to-ventilation ratio
  - i) 3 compressions to 1 ventilation

c. Pharmacological
- (1) Bradycardia
- (2) Low blood volume
- (3) Respiration depression secondary to narcotics
- (4) Metabolic acidosis

d. Non-pharmacological
- (1) Temperature control
- (2) Positioning

e. Transport consideration

(1) Rapid transportation of the distressed infant
(2) Position newborn on their side to prevent aspiration
f. Psychological support/ communication strategies
(1) Allow healthy newborn to bond with mother if possible

III Specific situations
A0 Meconium stained amniotic fluid
1 Epidemiology
a0 Incidence
(1) Approximately 10 - 15% of deliveries
(2) May occur either in utero or intrapartum
(3) Mostly in post-term and small-for-gestational-age newborns
b0 Morbidity/ mortality
(1) High mortality
(2) Hypoxemia
(3) Aspiration pneumonia
(4) Pneumothorax
(5) Pulmonary hypertension
c0 Risk factors
(1) Fetal distress during labor and delivery
(2) Post-term infants
2 Anatomy and physiology review
3 Pathophysiology
a0 Hypoxia or physiologic cause
b0 Aspiration of meconium stained amniotic fluid
(1) Airway obstruction
(a) Complete
i Atelectasis
ii Right-to-left shunt across the foramen ovale
(b) Incomplete
i Ball valve type obstruction
ii Developing pneumothorax
c0 Patient deterioration
(1) Hypoxia
(2) Hypercapnia
(3) Acidosis
4 Assessment findings
a0 Thin and watery
b0 Thick and particulate
(1) Dark green-black amniotic fluid
5 Management considerations for thick or particulate meconium
a0 Airway and ventilation
(1) Do not stimulate the infant to breathe
(2) Tracheal suction under direct visualization
(a) End point considerations
i Airway is clear
ii Infant breathes on own
iii Bradycardia
(3) Ventilate with 100% oxygen
b0 Circulation

(1) Assure adequate perfusion
c0 Pharmacological
(1) If hypotensive, administer fluid challenge
d0 Non-pharmacological
(1) Needle decompression may be required
(2) Hypothermia prevention
e0 Transport consideration
(1) Identify facility to handle high-risk newborn
f0 Psychological support/ communication strategies
(1) Do not discuss "chances of survival" with family
(2) Explain what is being done for the newborn

B0 Apnea in the neonate
1 Epidemiology
a0 Incidence
(1) Common finding in preterm infants
b0 Morbidity/ mortality
(1) If prolonged, can lead to hypoxemia and bradycardia
c0 Risk factors
(1) Prematurity
(2) In newborn, prolonged or difficult labor and delivery
(3) Drug exposure
2 Anatomy and physiology review
3 Pathophysiology
a0 Usually due to hypoxia or hypothermia
b0 May be due to other causes
(1) Narcotics or central nervous system depressant
(2) Airway and respiratory muscle weakness
(3) Oxyhemoglobin dissociation curve shift
(4) Septicemia
(5) Metabolic disorder
(6) Central nervous system disorders
4 Assessment findings
a0 Failure to breathe spontaneously after stimulation
b0 Respiratory pauses greater than 20 seconds
5 Management considerations
a0 Airway and ventilation
(1) Stimulate the baby to breathe
(a) Flicking the soles of the feet
(b) Rubbing the back
(2) Ventilate with BVM
(a) Disable pop-off valve
(b) Subsequent ventilations with minimal pressure to cause chest rise
(3) Suction as needed
(4) Intubation
(a) Indications
i Heart rate less that 60 with adequate BVM ventilation and chest compressions
ii Prolonged positive-pressure ventilations
iii Prolonged apnea

- iv Central cyanosis despite adequate ventilations
- (b) Complications
  - i Tube dislodgement
  - ii Tube occlusion by mucous or meconium
  - iii Pneumothorax
- b0 Circulation
  - (1) Monitor heart rate continuously
  - (2) Circulatory access
    - (a) Umbilical vein cannulation in newborn
    - (b) Peripheral IV
    - (c) Intraosseous
- c0 Pharmacological
  - (1) Consider narcotic antagonists if narcotic administered within four hours of delivery
  - (2) NO narcotic antagonist should be utilized if mother is a drug abuser
  - (3) Consider dextrose (D10) administration if hypoglycemic
- d0 Non-pharmacological
  - (1) Hypothermia preventions
- e0 Transport consideration
  - (1) Identify facility to handle high-risk newborn
- f0 Psychological support/ communication strategies
  - (1) Relatively good outcome if treated early and aggressively
  - (2) Explain what is being done for the infant

C0 Diaphragmatic hernia in the neonate

- 1 Epidemiology
  - a0 Incidence
    - (1) Occurs in 1 in 2200 live births
    - (2) Most commonly (90%) on the left side
  - b0 Morbidity/ mortality
    - (1) Survival for infant who require mechanical ventilation in the first 18 to 24 hours of life is approximately 50%
    - (2) If no respiratory distress within the first 24 hours of life survival approaches 100%
  - c0 Risk factors
    - (1) Bag and mask ventilation can worsen condition
- 2 Anatomy and physiology review
- 3 Pathophysiology
  - a0 Abdominal contents are displaced into the thorax
  - b0 Heart may be displaced
- 4 Assessment findings
  - a0 Little to severe distress
  - b0 May have cyanosis unresponsive to ventilations
  - c0 Scaphoid (flat) abdomen
  - d0 Bowel sounds heard in chest
  - e0 Heart sounds displaced to right
- 5 Management considerations
  - a0 Airway and ventilation
    - (1) Assure adequate oxygen
    - (2) Place an orogastric tube and apply low, intermittent suction
    - (3) Endotracheal intubation may be necessary

- **b0 Circulation**
  - **(1) Monitor heart rate continuously**
- **c0 Pharmacological**
  - **(1) None indicated for primary problem**
- **d0 Non-pharmacological**
  - **(1) Surgical repair required**
- **e0 Transport consideration**
  - **(1) Identify facility to handle high-risk newborn**
- **f0 Psychological support/ communication strategies**
  - **(1) Explain what is being done for the infant**

D0 Bradycardia in the neonate

- **1 Epidemiology**
  - **a0 Incidence**
    - **(1) Most commonly caused by hypoxia**
    - **(2) Increased intracranial pressure**
    - **(3) Hypothyroidism**
    - **(4) Acidosis**
  - **b0 Morbidity/ mortality**
    - **(1) Minimal risk if hypoxia is corrected quickly**
  - **c0 Risk factors**
    - **(1) Treatment via pharmacological measures alone**
    - **(2) Prolonged suction or airway instrumentation**
- **2 Anatomy and physiology review**
- **3 Pathophysiology**
  - **a0 Primarily caused by hypoxia**
- **4 Assessment findings**
  - **a0 Assess upper airway for obstruction**
    - **(1) Secretions**
    - **(2) Tongue and soft tissue positioning**
    - **(3) Foreign body**
  - **b0 Assess patient for hypoventilation**
  - **c0 Palpate umbilical stump or brachial artery**
- **5 Management considerations**
  - **a0 Airway and ventilation**
    - **(1) Suction**
    - **(2) Positive pressure ventilation with 100% oxygen**
    - **(3) Endotracheal intubation**
  - **b0 Circulation**
    - **(1) Heart rate less that 100**
      - **(a) BVM ventilation with 100% oxygen and reassess**
    - **(2) Heart rate less that 60**
      - **(a) Begin chest compressions**
    - **(3) Heart rate between 60 and 80 but not responding to assisted ventilations with BVM**
      - **(a) Begin chest compressions**
    - **(4) Discontinue chest compressions when heart rate reaches 100**
  - **c0 Pharmacological**
    - **(1) Epinephrine**
  - **d0 Non-pharmacological**
    - **(1) Maintain temperature**

- e0 Transport consideration
  - (1) Identify facility to handle high-risk newborn
- f0 Psychological support/ communication strategies
  - (1) Explain what is being done for the infant

E0 Premature infants

- 1 Epidemiology
  - a0 Incidence
    - (1) Born prior to 37 weeks gestation
    - (2) Weight ranges from .6-2.2 kg
  - b0 Morbidity/ mortality
    - (1) Healthy premature infants weighing greater than 1700 g have a survivability and outcome approximately that of full-term infants
    - (2) Respiratory suppression
    - (3) Hypothermia risk
    - (4) Head/ brain injury
      - (a) Hypoxemia
      - (b) Change in blood pressure
      - (c) Intraventricular hemorrhage
      - (d) Fluctuations in serum osmolarity
  - c0 Risk factors
    - (1) Mortality decreases weekly with gestation beyond the onset of viability (currently around 23-24 weeks of gestation)
- 2 Anatomy and physiology review
- 3 Pathophysiology
  - a0 Retinopathy of prematurity
    - (1) Result of long term oxygen use
    - (2) Extreme prematurity
    - (3) Should not be a factor in short term management
    - (4) Hypoxemia causes irreparable brain damage
- 4 Assessment findings
  - a0 Degree of immaturity determines the physical characteristics
  - b0 Generally a large trunk and short extremities
  - c0 Skin is transparent and less wrinkles
  - d0 Less subcutaneous fat
- 5 Management considerations
  - a0 Attempt resuscitation if the infant has any sign of life
  - b0 Airway and ventilation
    - (1) Suction
    - (2) Assure adequate oxygenation
  - c0 Circulation
    - (1) Chest compressions if indicated
  - d0 Pharmacological
    - (1) Epinephrine
  - e0 Non-pharmacological
    - (1) Maintain body temperature
  - f0 Transport consideration
    - (1) Transport to a facility with special services for low birth weight newborns
  - g0 Psychological support/ communication strategies
    - (1) Explain what is being done for the infant

- **F0 Respiratory distress/ cyanosis in the neonate**
  - **1 Epidemiology**
    - **a0 Incidence**
      - **(1) Prematurity is the single most common factor**
      - **(2) Occurs most frequently in infants less than 1200 grams and 30 weeks gestation**
      - **(3) Multiple gestations increase risk**
      - **(4) Prenatal maternal complications increase risk**
    - **b0 Morbidity/ mortality**
      - **(1) Premature infants have a immature central respiratory control center**
      - **(2) Easily affected by environmental or metabolic changes**
    - **c0 Risk factors**
      - **(1) Associated respiratory diseases/ complications affect oxygenation**
  - **2 Anatomy and physiology review**
  - **3 Pathophysiology**
    - **a0 Lung or heart disease**
    - **b0 Primary pulmonary hypertension**
    - **c0 CNS disorders**
    - **d0 Mucous obstruction of nasal passages**
    - **e0 Spontaneous pneumothorax**
    - **f0 Choanal atresia**
    - **g0 Meconium aspiration**
    - **h0 Amniotic fluid aspiration**
    - **i0 Lung immaturity**
    - **j0 Pneumonia**
    - **k0 Shock and sepsis**
    - **l0 Metabolic acidosis**
    - **m0 Diaphragmatic hernia**
    - **n0 Can lead to cardiac arrest**
  - **4 Assessment findings**
    - **a0 Tachypnea**
    - **b0 Paradoxical breathing**
    - **c0 Periodic breathing**
    - **d0 Intercostal retractions**
    - **e0 Nasal flaring**
    - **f0 Expiratory grunt**
  - **5 Management considerations**
    - **a0 Airway and ventilation**
      - **(1) Suction**
      - **(2) High concentration oxygen**
      - **(3) BVM**
      - **(4) Consider intubation**
    - **b0 Circulation**
      - **(1) Chest compressions if indicated**
    - **c0 Pharmacological**
      - **(1) Sodium bicarbonate may be helpful for prolonged resuscitation per medical direction**
      - **(2) D10 administration if hypoglycemic**
    - **d0 Non-pharmacological**

- (1) Maintain normal body temperature
- e0 Transport consideration
- f0 Psychological support/ communication strategies
  - (1) Explain what is being done for the infant

G0 Seizures in the neonate

- 1 Epidemiology
  - a0 Incidence
    - (1) Occur in a very small percentage of all newborns
  - b0 Morbidity/ mortality
    - (1) Represent relative medical emergencies as they are usually a sign of an underlying abnormality
  - c0 Risk factors
    - (1) Prolonged and frequent multiple seizures may result in metabolic changes and cardiopulmonary difficulties
- 2 Anatomy and physiology review
- 3 Pathophysiology
  - a0 Types of seizures
    - (1) Subtle seizure
      - (a) Eye deviation, blinking, sucking, swimming movements of the arms, pedaling movements of the legs, apnea
    - (2) Tonic seizure
      - (a) Tonic extension of the limbs
      - (b) Less commonly, flexion of the upper extremities and extension of the lower extremities
      - (c) More common in premature infants, especially in those with intraventricular hemorrhage
    - (3) Multi focal seizure
      - (a) Clonic activity in one extremity
      - (b) Randomly migrates to another area of the body
      - (c) Occur primarily in full-term infants
    - (4) Focal clonic seizure
      - (a) Clonic localized jerking
      - (b) Occur in both full-term and premature infants
    - (5) Myoclonic seizure
      - (a) Flexion jerks of the upper or lower extremities
      - (b) May occur singly or in a series of repetitive jerks
  - b0 Causes
    - (1) Hypoglycemia
    - (2) Other
      - (a) Hypoxic-ischemic encephalopathy
      - (b) Intracranial hemorrhage
      - (c) Metabolic disturbances
      - (d) Meningitis or encephalopathy
      - (e) Developmental abnormalities
      - (f) Drug withdrawal
- 4 Assessment findings
  - a0 Decreased level of consciousness
  - b0 Seizure activity
- 5 Management considerations
  - a0 Airway and ventilation

(1) Maintain oxygen saturation
b0 Circulation
c0 Pharmacological
(1) Consider D_{10} for hypoglycemia
(2) Consider anticonvulsant
(3) Consider benzodiazepine for status epilepticus
d0 Non-pharmacological
(1) Maintain normal body temperature
e0 Transport consideration
(1) Identify facility to handle high-risk newborn
f0 Psychological support/ communication strategies
(1) Explain what is being done for the infant

H0 Fever in the neonate
1 Epidemiology
a0 Incidence
(1) Rectal temperature $\geq$ 100.4 F (38.0 degrees C)
(2) Average normal temperature - 99.5 degrees F (37.5 degrees C)
b0 Morbidity/ mortality
(1) Limited ability to control body temperature
c0 Risk factors
(1) Dehydration may contribute to hyperthermia
2 Anatomy and physiology review
3 Pathophysiology
a0 Increased use of glucose to maintain normal body temperature
b0 Anaerobic metabolism results due to a lack of glucose
4 Assessment findings
a0 Mental status changes (irritability/ somnolence)
b0 Decreased intake
c0 Caretaker history
d0 Feels warm
e0 Observe patient for rashes, petechia
f0 Term newborns will produce beads of sweat on their brow but not over the rest of their body
g. Premature infants will have no visible sweat
5. Management considerations
a. Airway and ventilation
(1 Assure adequate oxygenation and ventilation
b. Circulation
(1 Perform chest compressions if indicated
c. Pharmacological
(1 Administration of antipyretic agent is questionable in the prehospital setting
d. Non-pharmacological
e. Transport consideration
f. Psychological support/ communication strategies
(1 Explain what is being done for the infant

I. Hypothermia in the neonate
1. Epidemiology
a. Incidence
(1 Body temperature drops below 35 degrees C

- **b. Morbidity/ mortality**
  - **(1 Infants may die of cold exposure at temperatures adults find comfortable**
- **c. Risk factors**
  - **(1 Four method of heat loss need to be controlled**
    - **(a Evaporation**
    - **(b Conduction**
    - **(c Convection**
    - **(d Radiation**

2. Anatomy and physiology review

3. Pathophysiology

- **a. Increased surface-to-volume relation makes newborns extremely sensitive to environmental conditions, especially when they are wet after delivery**
- **b. Can be an indicator of sepsis in the neonate**
- **c. Increased metabolic demand can cause metabolic acidosis, pulmonary hypertension and hypoxemia**

4. Assessment findings

- **a. Pale color**
- **b. Cool to touch, particular in extremities**
- **c. Acrocyanosis**
- **d. Respiratory distress**
- **e. Apnea**
- **f. Bradycardia**
- **g. Central cyanosis**
- **h. Irritability initially**
- **i. Lethargy in late stage**
- **j. Generally <u>do not</u> shiver**

5. Management considerations

- **a. Airway and ventilation**
  - **(1 Assure adequate oxygenation and ventilation**
- **b. Circulation**
  - **(1 Perform chest compressions if indicated**
- **c. Pharmacological**
  - **(1 D10 if hypoglycemic**
  - **(2 Warm IV fluids**
- **d. Non-pharmacological**
  - **(1 Environmental conditions should be 24 to 26.5 degrees C**
  - **(2 Warm hands prior to touching patient**
- **e. Transport consideration**
  - **(1 Identify facility to handle high-risk newborn**
- **f. Psychological support/ communication strategies**
  - **(1 Explain what is being done for the infant**

J. Hypoglycemia in the neonate

1. Epidemiology

- **a. Incidence**
  - **(1 Blood glucose concentration should be determined on all sick infants**
  - **(2 May be due to inadequate glucose intake or increased utilization of glucose**
- **b. Morbidity/ mortality**

- (1 Persistent low blood glucose levels may have catastrophic effects on the brain
- c. Risk factors
  - (1 Asphyxia, toxemia, smaller twin, CNS hemorrhage, sepsis
- 2. Anatomy and physiology review
- 3. Pathophysiology
  - a. A blood glucose screening test less than 45 mg/dl indicates hypoglycemia
  - b. Glycogen stores are sufficient to meet glucose requirements for 8 to 12 hours
  - c. Body releases counter-regulatory hormones including Glucagon, epinephrine, cortisol and growth hormone
  - d. Hormones may cause symptoms of hyperglycemia that last for several hours
- 4. Assessment findings
  - a. Twitching or seizures, limpness, lethargy, eye-rolling, high pitched cry, apnea, irregular respirations and possible cyanosis
- 5. Management considerations
  - a. Airway and ventilation
    - (1 Assure adequate oxygenation and ventilation
  - b. Circulation
    - (1 Perform chest compressions if indicated
  - c. Pharmacological
    - (1 Administer D10
  - d. Non-pharmacological
    - (1 Maintain normal body temperature
  - e. Transport consideration
    - (1 Identify facility to handle high-risk newborn
  - f. Psychological support/ communication strategies
    - (1 Explain what is being done for the infant

K. Vomiting in the neonate

- 1. Epidemiology
  - a. Incidence
    - (1 Persistent vomiting is a warning sign
    - (2 Vomiting mucous, occasionally blood streaked, in the first few hours of life is not uncommon
  - b. Morbidity/ mortality
    - (1 Vomiting in the first 24 hours of life suggests obstruction in the upper digestive tract or increased intracranial pressure
    - (2 Vomitus containing dark blood is usually a sign of a life-threatening illness
  - c. Risk factors
    - (1 Aspiration of vomitus can cause respiratory insufficiencies or obstruction of the airway
- 2. Anatomy and physiology review
- 3. Pathophysiology
  - a. Vomiting of non-bile-stained fluid
    - (1 Anatomic or functional obstruction at or above the first portion of the duodenum
    - (2 Gastroesophageal reflux
  - b. Vomiting of bile-stained fluid

- (1 Obstruction below the opening of the bile duct
- 4. Assessment findings
  - a. Distended stomach
  - b. Infection
  - c. Increased ICP
  - d. Drug withdrawal
- 5. Management considerations
  - a. Airway and ventilation
    - (1 Maintain a patent airway
    - (2 Suction/ clear vomitus from airway
    - (3 Assure adequate oxygenation
  - b. Circulation
    - (1 Bradycardia may be caused by vagal stimulus
  - c. Pharmacological
    - (1 Fluid administration may be required
  - d. Non-pharmacological
    - (1 Provide supportive measures
  - e. Transport consideration
    - (1 Place infant on side
    - (2 Identify facility to handle high-risk newborn
- 6. Psychological support/ communication strategies
  - a. Explain what is being done for the infant

L. Diarrhea in the neonate

- 1. Epidemiology
  - a. Incidence
    - (1 Normal - five to six stools per day, especially if breast feeding
  - b. Morbidity/ mortality
    - (1 Severe cases can cause dehydration
    - (2 Bacterial or viral infection may be involved
  - c. Risk factors
    - (1 Severe loss can cause electrolyte imbalance
- 2. Anatomy and physiology review
- 3. Pathophysiology
  - a. Gastroenteritis
  - b. Lactose intolerance
  - c. Phototherapy
  - d. Neonatal abstinence syndrome
  - e. Thyrotoxicosis
  - f. Cystic fibrosis
- 4. Assessment findings
  - a. Loose stools
  - b. Decreased urinary output
  - c. Signs of dehydration
- 5. Management considerations
  - a. Airway and ventilation
    - (1 Assure adequate oxygenation
  - b. Circulation
    - (1 Perform chest compressions if indicated
  - c. Pharmacological
    - (1 Fluid therapy may be indicated

- **d. Non-pharmacological**
  - **(1 BSI procedures**
- **e. Transport consideration**
  - **(1 Identify facility to handle high-risk newborn**
- **f. Psychological support/ communication strategies**
  - **(1 Explain what is being done for the infant**

M. Common birth injuries in the newborn

- **1. Epidemiology**
  - **a. Incidence**
    - **(1 Used to denote avoidable and unavoidable mechanical and anoxic trauma incurred by the infant during labor and delivery**
    - **(2 Estimated to occur in 2 to 7 of every 1,000 live births**
  - **b. Morbidity/ mortality**
    - **(1 5 to 8 of every 100,000 infants die of birth trauma**
    - **(2 25 of every 100,000 die of anoxic injuries**
    - **(3 Such injuries account for 2 - 3% of infant deaths**
  - **c. Risk factors**
    - **(1 Explosive delivery**
- **2. Anatomy and physiology review**
- **3. Pathophysiology**
  - **a. Cranial injuries**
    - **(1 Molding of the head and overriding of the parietal bones**
    - **(2 Erythema, abrasions, ecchymosis and subcutaneous fat necrosis can occur with forceps delivery**
    - **(3 Subconjunctival and retinal hemorrhage**
    - **(4 Subperiosteal hemorrhage**
    - **(5 Fracture of the skull**
  - **b. Intracranial hemorrhage**
    - **(1 May result from trauma or asphyxia**
  - **c. Spine and spinal cord**
    - **(1 Strong traction exerted when the spine is hyperextended or pull is lateral**
  - **d. Peripheral nerve injury**
  - **e. Liver**
  - **f. Rupture of the spleen**
  - **g. Adrenal hemorrhage**
  - **h. Fracture**
    - **(1 Clavicle**
    - **(2 Extremities**
  - **i. Hypoxia-ischemia**
- **4. Assessment findings**
  - **a. Diffuse, sometimes ecchymotic, edematous swelling of the soft tissues of the scalp**
  - **b. Paralysis below the level of spinal cord injury**
  - **c. Paralysis of the upper arm with or without paralysis of the forearm**
  - **d. Diaphragmatic paralysis**
  - **e. Movement on only one side of the face when the newborn cries**
  - **f. Does not move arm freely on side of fractured clavicle**
  - **g. Lack of spontaneous movement of the affected extremity**

- h. Hypoxia
- i. Shock

5. Management considerations
   - a. Airway and ventilation
     - (1 Assure adequate oxygenation and ventilation
   - b. Circulation
     - (1 Perform chest compressions if indicated
   - c. Pharmacology
     - (1 Provide if indicated
   - d. Non-pharmacological
     - (1 Provide supportive measures
   - e. Transport consideration
     - (1 Identify facility to handle high-risk newborn
   - f. Psychological support/ communication strategies
     - (1 Explain what is being done for the newborn

IV. Neonatal resuscitation and post resuscitation and stabilization

A. Neonatal cardiac arrest management

1. Epidemiology
   - a. Incidence
     - (1 Primarily related to hypoxia
   - b. Morbidity/ mortality
     - (1 Outcome is poor if interventions are not initiated quickly
     - (2 Increased likelihood of brain and organ damage
   - c. Risk factors
     - (1 Intrauterine asphyxia
     - (2 Prematurity
     - (3 Drugs administered to or taken by the mother
     - (4 Congenital neuromuscular diseases
     - (5 Congenital malformations
     - (6 Intrapartum hypoxemia
2. Anatomy and physiology review
3. Pathophysiology
   - a. Primary apnea
   - b. Secondary apnea
   - c. Bradycardia
   - d. Persistent fetal circulation
   - e. Pulmonary hypertension
4. Assessment findings
   - a. Peripherial cyanosis
   - b. Inadequate respiratory effort
   - c. Ineffective or absent heart rate
5. Management considerations
   - a. Airway and ventilation
     - (1 Assure adequate oxygenation and ventilation
       - (a Blow-by oxygenation is required if peripheral cyanosis is present and despite adequate respiratory effort and heart rate greater than 100 beats/ min
       - (b Ventilations are required if respiratory effort is inadequate, ineffective or absent or heart rate is less than 80 beats/ min

(c Ventilate at a rate of 40 to 60 breaths per minute
(d Administer a tidal volume sufficient to expand the chest
(e Intubation required if bag-valve-mask ventilations are ineffective, tracheal suctioning is required or prolonged positive-pressure ventilation is necessary

b. Chest compressions are indicated if pulse is less than 60 beats/ minute, or between 60 and 80 beats/ minute and not improving despite assisted ventilations with BVM
(1 Suction airway thoroughly

c. Circulation
(1 Perform chest compression

d. Pharmacological
(1 Epinephrine
(2 Normal saline or Ringer's lactate
(3 Sodium bicarbonate
(4 Naloxone
(5 Dextrose (D10)

e. Non-pharmacological
(1 Maintain normal body temperature

f. Transport consideration
(1 Identify facility to handle high-risk newborn

g. Psychological support/ communication strategies

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UNIT TERMINAL OBJECTIVE

6-2.1 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan for the pediatric patient.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

6-2.2 Discuss the paramedic's role in the reduction of infant and childhood morbidity and mortality from acute illness and injury. (C-1)
6-2.3 Identify methods/ mechanisms that prevent injuries to infants and children. (C-1)
6-2.4 Describe Emergency Medical Services for Children (EMSC). (C-1)
6-2.5 Discuss how an integrated EMSC system can affect patient outcome. (C-2)
6-2.6 Identify key growth and developmental characteristics of infants and children and their implications. (C-2)
6-2.7 Identify key anatomical and physiological characteristics of infants and children and their implications. (C-2)
6-2.8 Describe techniques for successful assessment of infants and children. (C-1)
6-2.9 Describe techniques for successful treatment of infants and children. (C-1)
6-2.10 Identify the common responses of families to acute illness and injury of an infant or child. (C-1)
6-2.11 Describe techniques for successful interaction with families of acutely ill or injured infants and children. (C-1)
6-2.12 Outline differences in adult and childhood anatomy and physiology. (C-3)
6-2.13 Identify "normal" age group related vital signs. (C-1)
6-2.14 Discuss the appropriate equipment utilized to obtain pediatric vital signs. (C-1)
6-2.15 Determine appropriate airway adjuncts for infants and children. (C-1)
6-2.16 Discuss complications of improper utilization of airway adjuncts with infants and children. (C-1)
6-2.17 Discuss appropriate ventilation devices for infants and children. (C-1)
6-2.18 Discuss complications of improper utilization of ventilation devices with infants and children. (C-1)
6-2.19 Discuss appropriate endotracheal intubation equipment for infants and children. (C-1)
6-2.20 Identify complications of improper endotracheal intubation procedure in infants and children. (C-1)
6-2.21 List the indications and methods for gastric decompression for infants and children. (C-1)
6-2.22 Define respiratory distress. (C-1)
6-2.23 Define respiratory failure. (C-1)
6-2.24 Define respiratory arrest. (C-1)
6-2.25 Differentiate between upper airway obstruction and lower airway disease. (C-3)
6-2.26 Describe the general approach to the treatment of children with respiratory distress, failure, or arrest from upper airway obstruction or lower airway disease. (C-3)
6-2.27 Discuss the common causes of hypoperfusion in infants and children. (C-1)
6-2.28 Evaluate the severity of hypoperfusion in infants and children. (C-3)
6-2.29 Identify the major classifications of pediatric cardiac rhythms. (C-1)
6-2.30 Discuss the primary etiologies of cardiopulmonary arrest in infants and children. (C-1)
6-2.31 Discuss age appropriate vascular access sites for infants and children. (C-1)
6-2.32 Discuss the appropriate equipment for vascular access in infants and children. (C-1)
6-2.33 Identify complications of vascular access for infants and children. (C-1)
6-2.34 Describe the primary etiologies of altered level of consciousness in infants and children. (C-1)
6-2.35 Identify common lethal mechanisms of injury in infants and children. (C-1)
6-2.36 Discuss anatomical features of children that predispose or protect them from certain injuries. (C-1)
6-2.37 Describe aspects of infant and children airway management that are affected by potential cervical spine injury. (C-1)

6-2.38 Identify infant and child trauma patients who require spinal immobilization. (C-1)
6-2.39 Discuss fluid management and shock treatment for infant and child trauma patient. (C-1)
6-2.40 Determine when pain management and sedation are appropriate for infants and children. (C-1)
6-2.41 Define child abuse. (C-1)
6-2.42 Define child neglect. (C-1)
6-2.43 Define sudden infant death syndrome (SIDS). (C-1)
6-2.44 Discuss the parent/ caregiver responses to the death of an infant or child. (C-1)
6-2.45 Define children with special health care needs. (C-1)
6-2.46 Define technology assisted children. (C-1)
6-2.47 Discuss basic cardiac life support (CPR) guidelines for infants and children. (C-1)
6-2.48 Identify appropriate parameters for performing infant and child CPR. (C-1)
6-2.49 Integrate advanced life support skills with basic cardiac life support for infants and children. (C-3)
6-2.50 Discuss the indications, dosage, route of administration and special considerations for medication administration in infants and children. (C-1)
6-2.51 Discuss appropriate transport guidelines for infants and children. (C-1)
6-2.52 Discuss appropriate receiving facilities for low and high risk infants and children. (C-1)
6-2.53 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for respiratory distress/ failure in infants and children. (C-1)
6-2.54 Discuss the pathophysiology of respiratory distress/ failure in infants and children. (C-1)
6-2.55 Discuss the assessment findings associated with respiratory distress/ failure in infants and children. (C-1)
6-2.56 Discuss the management/ treatment plan for respiratory distress/ failure in infants and children. (C-1)
6-2.57 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for hypoperfusion in infants and children. (C-1)
6-2.58 Discuss the pathophysiology of hypoperfusion in infants and children. (C-1)
6-2.59 Discuss the assessment findings associated with hypoperfusion in infants and children. (C-1)
6-2.60 Discuss the management/ treatment plan for hypoperfusion in infants and children. (C-1)
6-2.61 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for cardiac dysrhythmias in infants and children. (C-1)
6-2.62 Discuss the pathophysiology of cardiac dysrhythmias in infants and children. (C-1)
6-2.63 Discuss the assessment findings associated with cardiac dysrhythmias in infants and children. (C-1)
6-2.64 Discuss the management/ treatment plan for cardiac dysrhythmias in infants and children. (C-1)
6-2.65 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for neurological emergencies in infants and children. (C-1)
6-2.66 Discuss the pathophysiology of neurological emergencies in infants and children. (C-1)
6-2.67 Discuss the assessment findings associated with neurological emergencies in infants and children. (C-1)
6-2.68 Discuss the management/ treatment plan for neurological emergencies in infants and children. (C-1)
6-2.69 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for trauma in infants and children. (C-1)
6-2.70 Discuss the pathophysiology of trauma in infants and children. (C-1)
6-2.71 Discuss the assessment findings associated with trauma in infants and children. (C-1)
6-2.72 Discuss the management/ treatment plan for trauma in infants and children. (C-1)
6-2.73 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for abuse and neglect in infants and children. (C-1)
6-2.74 Discuss the pathophysiology of abuse and neglect in infants and children. (C-1)
6-2.75 Discuss the assessment findings associated with abuse and neglect in infants and children. (C-1)

6-2.76 Discuss the management/ treatment plan for abuse and neglect in infants and children, including documentation and reporting. (C-1)
6-2.77 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for SIDS infants. (C-1)
6-2.78 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for children with special health care needs including technology assisted children. (C-1)
6-2.79 Discuss the pathophysiology of children with special health care needs including technology assisted children. (C-1)
6-2.80 Discuss the assessment findings associated for children with special health care needs including technology assisted children. (C-1)
6-2.81 Discuss the management/ treatment plan for children with special health care needs including technology assisted children. (C-1)
6-2.82 Describe the epidemiology, including the incidence, morbidity/ mortality, risk factors and prevention strategies for SIDS infants. (C-1)
6-2.83 Discuss the pathophysiology of SIDS in infants. (C-1)
6-2.84 Discuss the assessment findings associated with SIDS infants. (C-1)
6-2.85 Discuss the management/ treatment plan for SIDS in infants. (C-1)

AFFECTIVE OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

6-2.86 Demonstrate and advocate appropriate interactions with the infant/ child that conveys an understanding of their developmental stage. (A-3)
6-2.87 Recognize the emotional dependance of the infant/ child to their parent/ guardian. (A-1)
6-2.88 Recognize the emotional impact of the infant/ child injuries and illnesses on the parent/ guardian. (A-1)
6-2.89 Recognize and appreciate the physical and emotional difficulties associated with separation of the parent/ guardian of a special needs child (A-3)
6-2.90 Demonstrate the ability to provide reassurance, empathy and compassion for the parent/ guardian. (A-1)

PSYCHOMOTOR OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

6-2.91 Demonstrate the appropriate approach for treating infants and children. (P-2)
6-2.92 Demonstrate appropriate intervention techniques with families of acutely ill or injured infants and children. (P-2)
6-2.93 Demonstrate an appropriate assessment for different developmental age groups. (P-2)
6-2.94 Demonstrate an appropriate technique for measuring pediatric vital signs. (P-2)
6-2.95 Demonstrate the use of a length-based resuscitation device for determining equipment sizes, drug doses and other pertinent information for a pediatric patient. (P-2)
6-2.96 Demonstrate the appropriate approach for treating infants and children with respiratory distress, failure, and arrest. (P-2)
6-2.97 Demonstrate proper technique for administering blow-by oxygen to infants and children. (P-2)
6-2.98 Demonstrate the proper utilization of a pediatric non-rebreather oxygen mask. (P-2)
6-2.99 Demonstrate proper technique for suctioning of infants and children. (P-2)
6-2.100 Demonstrate appropriate use of airway adjuncts with infants and children. (P-2)
6-2.101 Demonstrate appropriate use of ventilation devices for infants and children. (P-2)
6-2.102 Demonstrate endotracheal intubation procedures in infants and children. (P-2)

6-2.103 Demonstrate appropriate treatment/ management of intubation complications for infants and children. (P-2)
6-2.104 Demonstrate appropriate needle cricothyroidotomy in infants and children. (P-2)
6-2.105 Demonstrate proper placement of a gastric tube in infants and children. (P-2)
6-2.106 Demonstrate an appropriate technique for insertion of peripheral intravenous catheters for infants and children. (P-2)
6-2.107 Demonstrate an appropriate technique for administration of intramuscular, inhalation, subcutaneous, rectal, endotracheal and oral medication for infants and children. (P-2)
6-2.108 Demonstrate an appropriate technique for insertion of an intraosseous line for infants and children. (P-2)
6-2.109 Demonstrate appropriate interventions for infants and children with a partially obstructed airway. (P-2)
6-2.110 Demonstrate age appropriate basic airway clearing maneuvers for infants and children with a completely obstructed airway. (P-2)
6-2.111 Demonstrate proper technique for direct larnyngoscopy and foreign body retrieval in infants and children with a completely obstructed airway. (P-2)
6-2.112 Demonstrate appropriate airway and breathing control maneuvers for infant and child trauma patients. (P-2)
6-2.113 Demonstrate appropriate treatment of infants and children requiring advanced airway and breathing control. (P-2)
6-2.114 Demonstrate appropriate immobilization techniques for infant and child trauma patients. (P-2)
6-2.115 Demonstrate treatment of infants and children with head injuries. (P-2)
6-2.116 Demonstrate appropriate treatment of infants and children with chest injuries. (P-2)
6-2.117 Demonstrate appropriate treatment of infants and children with abdominal injuries. (P-2)
6-2.118 Demonstrate appropriate treatment of infants and children with extremity injuries. (P-2)
6-2.119 Demonstrate appropriate treatment of infants and children with burns. (P-2)
6-2.120 Demonstrate appropriate parent/ caregiver interviewing techniques for infant and child death situations.(P-2)
6-2.121 Demonstrate proper infant CPR. (P-2)
6-2.122 Demonstrate proper child CPR. (P-2)
6-2.123 Demonstrate proper techniques for performing infant and child defibrillation and synchronized cardioversion.(P-2)

DECLARATIVE

1. Introduction
   - A. Epidemiology of EMS incidents involving pediatric patients
   - B. Paramedic role in treating infants and children
     - 1. Care of the pediatric patient
       - a. Prehospital care (primary transport)
       - b. Interfacility transfer (secondary transport)
     - 2. Maintain and improve pediatric knowledge and clinical skills
       - a. Continuing education programs
         - (1) Pediatric Advanced Life Support
         - (2) Pediatric Basic Trauma Life Support
         - (3) Advanced Pediatric Life Support
         - (4) Pediatric Emergencies for Paramedics
         - (5) Regional conferences and seminars
       - b. Clinical application
         - (1) Pediatric emergency department
         - (2) Pediatric hospital
         - (3) Pediatric department of a community hospital
         - (4) Pediatrician office
       - c. Textbooks and journals
       - d. Teaching Resource for Instructors of Prehospital Pediatrics (TRIPP)
     - 3. Reduction of mortality and morbidity
       - a. Educational programs
         - (1) Schools
         - (2) Community
         - (1) Parents
       - b. Prevention
         - (1) Community involvement
         - (2) Safety inspections
       - c. Documentation
         - (1) Prehospital and trauma registries
         - (2) Epidemiological research and surveillance
   - C. Emergency Medical Services for Children (EMSC)
     - 1. Coordinated national effort to improve the health of pediatric patients who suffer potentially life-threatening illness or injury
     - 2. Specific areas of pediatric health care concern have been identified
       - a. System approach
       - b. Education
       - c. Data collection
       - d. Quality improvement

e. Injury prevention
f. Access
g. Prehospital care
h. Emergency care
i. Definitive care
j. Rehabilitation
k. Finance
l. On-going health care from birth to young adulthood

D. Definitions
1. Newborn
a. First few hours of life (perinatal period)
b. Resuscitation follows Neonatal Advanced Life Support (NALS) guidelines
2. Infant
a. Neonatal period (first 28 days of life) is included
b. First month after birth to approximately 12 months of age
c. Resuscitation follows Pediatric Advanced Life Support (PALS) guidelines
3. Toddler
a. A child between 12 and 36 months of age
4. Preschool
a. A child between three and five years of age
5. School age
a. The child between 6 and 12 years of age
6. Adolescent
a. The period between the end of childhood and adulthood (18 years)
(1) Early (puberty)
(2) Middle (junior high school/ high school age)
(3) Late (high school/ college age)
b. End of childhood is usually defined as the beginning of puberty
(1) Highly child specific
(2) Male child average 13 years
(3) Female child average 11 years

2. Growth and development review
A. Infant
1. Physical development
a. Neonate (first month of life)
(1) Weight
(2) Crying
(a) Typical causes
(b) Persistent crying may indicate physiologic distress

- (3) Movements
- (4) Sleep

b. Infant (2-12 months)

- (1) Weight
- (2) Crying
  - (a) Gradually decreases throughout infancy
  - (b) Persistent crying may indicated physiological distress
- (3) Movements
  - (a) Young infant
  - (b) Older infant
- (4) Sleep

2. Cognitive development
   a. Neonate (first month of life)
   b. Infant (2-12 months)
      (1) Young infant
      (2) Older infant
3. Emotional development
   a. Neonate (first month of life)
   b. Infant (2-12 months)
4. Paramedic implications
   a. Keep the patient warm and dry
   b. Handle patient gently, supporting head and neck
   c. Speak quietly
   d. Involve caregivers in treatment whenever possible
   1. Persistent crying, irritability, or inability to console or arouse patient may indicate physiologic distress
   e. Foreign body airway obstruction risk begins at approximately 6 months and increases

B. Toddler

1. Physical development
   a. Weight
   b. Movements
2. Cognitive development
3. Emotional development
4. Paramedic implications
   a. Keep the patient warm
   b. Handle patient gently
   c. Speak quietly and use simple words
   d. Distract patient with interesting objects (toy) during exam
   e. Avoid procedures on the dominant hand/ arm
   f. Involve caregivers in treatment whenever possible
   g. Try not to separate child from the caregiver

h. Allow child to hold transitional objects (blanket, stuffed animal, etc.)
2. Persistent irritability, and inability to console or arouse patient may indicate physiologic distress
i. Foreign body airway obstruction continues to be a risk

C. Preschool
1. Physical development
a. Weight
b. Movements
2. Cognitive development
3. Emotional development
4. Paramedic implications
a. Keep the patient warm
b. Handle patient gently
c. Speak quietly in clear and unambiguous language; avoid baby talk
d. Offer the patient treatment choices if possible
e. Involve caregivers in treatment whenever possible
3. Persistent irritability, or inability to arouse patient may indicate physiologic distress
f. Foreign body airway obstruction risk continues
g. Respect patient modesty
h. Avoid frightening or misleading comments

D. School age
1. Physical development
a. Weight
b. Movement
2. Cognitive development
3. Emotional development
4. Paramedic implications
a. Keep the patient warm
b. Speak in clear and unambiguous language
c. Be honest about procedures inducing pain
d. Involve the patient in treatment whenever possible
4. Persistent irritability, or inability to arouse patient may indicate physiologic distress
e. Respect patient modesty
f. Reassure patient of body integrity
g. Address preoccupations about death when appropriate

E. Adolescent
1. Physical development
2. Cognitive development
3. Emotional development

4. Paramedic implications
   a. Explain things clearly and honestly
   b. Involve the patient in treatment whenever possible
   c. Respect patient modesty
   d. Address patient concerns of body integrity/ disfigurement
   e. Deal with patient tactfully and fairly
   f. Vital signs approach adult values
   g. Consider the possibility of substance abuse, endangerment of self or others

3. Anatomy and physiology review
   A. Head
      1. Proportionally larger size
      2. Larger occipital region
      3. Fontanelles open in infancy
      4. Face is small in comparison to size of head
      5. Paramedic implications
         a. Higher proportion of blunt trauma involves the head
         b. Different airway positioning techniques
            (1) Place thin layer of padding under back of seriously injured child < 3 years of age to obtain neutral position
            (2) Place folded sheet under occiput of medically ill child > 3 years of age to obtain sniffing position
         c. Examine fontanelle in infants
            (1) Bulging fontanelle suggests increased intracranial pressure
            (2) Sunken fontanelle suggests dehydration
   B. Airway
      1. Narrower at all levels
      2. Infants are obligate nasal breathers
      3. Jaw is proportionally smaller in young children
      4. Larynx is higher (C 3-4) and more anterior
      5. Cricoid ring is the narrowest part of the airway in young children
      6. Tracheal cartilage softer
      7. Trachea smaller in both length and diameter
      8. Epiglottis
         a. Omega shaped in infants
         b. Extends at a 45 degree angle into airway
         c. Epiglottic folds have softer cartilage, therefore are more floppy, especially in infants
      9. Paramedic implications
         a. Keep nares clear in infants < 6 months of age
         b. Narrower upper airways are more easily obstructed

(1) Flexion or hyperextension
(2) Particulate matter
(3) Soft tissue swelling (injury, inflamation)

c. Differences in intubation technique
(1) Gentler touch
(2) Straight blade
(3) Lift epiglottis
(4) Uncuffed tube
(5) Precise placement

C. Chest and lungs
1. Ribs are positioned horizontally
2. Ribs are more pliable and offer less protection to organs
3. Chest muscles immature and fatigue easily
4. Lung tissue is more fragile
5. Mediastinum is more mobile
6. Thin chest wall allows for easily transmitted breath sounds
7. Paramedic implications
a. Infants and children are diaphragmatic breathers
b. Infants and children are prone to gastric distention
c. Rib fractures are less frequent but not uncommon in child abuse and trauma
d. Greater energy transmitted to underlying organs following trauma, therefore, significant internal injury can be present without external signs
e. Pulmonary contusions are more common in major trauma
f. Lungs prone to pneumothorax following barotrauma
g. Mediastinum has greater shift with tension pneumothorax
h. Easy to miss a pneumothorax or misplaced intubation due to transmitted breath sounds

D. Abdomen
1. Immature abdominal muscles offer less protection
2. Abdominal organs are closer togther
3. Liver and spleen proportionally larger and more vascular
4. Paramedic implications
a. Liver and spleen more frequently injured
b. Multiple organ injuries more common

E. Extremities
1. Bones are softer and more porous until adolescence
2. Injuries to growth plate may disrupt bone growth
3. Paramedic implications
a. Immobilize any “sprain” or “strain” as it is likely a fracture
b. Avoid piercing growth plate during intraosseous needle insertion

F. Skin and body surface area (BSA)
   1. Thinner and more elastic
   2. Thermal exposure results in deeper burn
   3. Less subcutaneous fat
   4. Larger surface area to body mass
   5. Paramedic implications
      a. More easily and deeply burned
      b. Larger losses of fluid and heat

G. Respiratory system
   1. Tidal volume proportionally similar to that of adolescents and adults
   2. Metabolic oxygen requirements of infants and children are approximately double those of adolescents and adults
   3. Proportionally smaller functional residual capacity therefore proportionally smaller oxygen reserves
   4. Paramedic implications
      a. Hypoxia develops rapidly because of increased oxygen requirements and decreased oxygen reserves

H. Cardiovascular system
   1. Cardiac output is rate dependent in infants and small children
   2. Vigorous but limited cardiovascular reserves
   3. Bradycardia is a response to hypoxia
   4. Can maintain blood pressure longer than an adult
   5. Circulating blood volume is proportionally larger than in an adult
   6. Absolute blood volume is smaller than in an adult
   7. Paramedic implications
      a. Smaller absolute volume of fluid/ blood loss needed to cause shock
      b. Larger proportional volume of fluid/ blood loss needed to cause shock
      c. Hypotension is a late sign of shock
      d. A child may be in shock despite normal blood pressure
      e. Shock assessment is based upon clinical signs of tissue perfusion
      f. Carefully assess for shock if tachycardia is present
      g. Monitor carefully for development of hypotension

I. Nervous system
   1. Develops throughout childhood
   2. Developing neural tissue is more fragile
   3. Brain and spinal cord are less well protected by skull and spinal column
   4. Paramedic implications
      a. Brain injuries are more devastating in young children
      b. Greater force transmitted to underlying brain of young children
      c. Spinal cord injury can occur without spinal column injury

J. Metabolic differences
1. Infants and children have a limited glycogen and glucose stores
2. Significant volume loss can result from vomiting and diarrhea
3. Prone to hypothermia due to increased body surface area
4. Newborns and neonates are unable to shiver to maintain body temperature
5. Paramedic implications
a. Keep child warm during treatment and transport
b. Cover the head to minimize heat loss

4. Assessment
A. General considerations
1. Many components of the initial patient evaluation can be done by observing the patient
1. Utilize the parent/ guardian to assist in making the infant or child more comfortable as appropriate
2. Interacting with parents and family
a. Normal responses to acute illness and injury
b. Parent/ guardian and child interaction
c. Intervention techniques
B. Physical exam
1. Scene survey
a. Observe the scene for hazards or potential hazards
b. Observe the scene for mechanism of injury/ illness
(1) Ingestion
(a) Pills, medicine bottles, household chemicals, etc.
(2) Child abuse
(a) Injury and history do not coincide, bruises not where they should be for mechanism of injury, etc.
(3) Position patient found
c. Observe the parent/ guardian/ caregiver interaction with the child
(1) Do they act appropriately
(2) Is parent/ guardian/ caregiver concerned
(3) Is parent/ guardian/ caregiver angry
(4) Is parent/ guardian/ caregiver indifferent
2. Initial assessment
a. General impression
(1) General impression of environment
(2) General impression of parent/ guardian and child interaction
(3) General impression of the patient/ Pediatric Assessment Triangle
(a) A structure for assessing the pediatric patient

(b) Focuses on the most valuable information for pediatric patients
(c) Used to ascertain if any life-threatening condition exists
(d) Components
i) Appearance
a) Mental status
b) Muscle tone
ii) Work of breathing
a) Respiratory rate
b) Respiratory effort
iii) Circulation
a) Skin signs
b) Skin color

(4) Initial triage decisions
(1) Urgent - proceed with rapid ABC assessment, treatment and transport
(e) Non urgent - proceed with focused history, detailed physical exam after initial assessment

b. Vital functions
(1) Determine level of consciousness
(a) AVPU scale
i) Alert
ii) Responds to verbal stimuli
iii) Responds to painful stimuli
iv) Unresponsive
(b) Modified Glasgow Coma Scale
(c) Signs of inadequate oxygenation
(2) Airway
(a) Determine patency
(3) Breathing
(a) Adequate chest rise and fall
(b) Use of accessory muscles
(c) Nasal flaring
(d) Tachypnea
(e) Bradypnea
(f) Irregular breathing pattern
(g) Head bobbing
(h) Grunting
(i) Absent breath sounds
(j) Abnormal sounds
(4) Circulation

(a) Pulse
i) Central
ii) Peripheral
iii) Quality of pulse
(b) Blood pressure
i) Measuring blood pressure is not necessary in children < 3 years of age
(c) Skin color
(d) Active hemorrhage
(5) Vital signs
(a) Infant
(b) Toddler
(c) Preschool
(d) School aged
(e) Adolescent

3. Transition phase
2. Utilized to allow the infant or child to become familiar with you and your equipment
c. Use of transition phase depends on the seriousness of the patient's condition
d. For the conscious, non-acutely ill child
e. For the unconscious, acutely ill child do not perform the transition phase but proceed directly to the treatment and transport

4. Focused history
a. Approach
(1) For infant, toddler, and preschool age patient, obtain from parent/ guardian
(2) For school age and adolescent patient, most information may be obtained from the patient
(3) For older adolescent patient question the patient in private regarding sexual activity, pregnancy, illicit drug and alcohol use
b. Content
(1) Chief complaint
(a) Nature of illness/ injury
(b) How long has the patient been sick/ injured
(c) Presence of fever
(d) Effects on behavior
(e) Bowel/ urine habits
(f) Vomiting/ diarrhea
(g) Frequency of urination
(2) Past medical history

(a) Infant or child under the care of a physician
(b) Chronic illnesses
(c) Medications
(d) Allergies

5. Detailed physical exam
   a. Examine all body regions
      (1) Head-to-toe in older child
      (2) Toe-to-head in younger child
   b. Some or all of the following may be appropriate, depending on the situation
      (1) Pupils
      (2) Capillary refill
         (a) Normal - two seconds or less
         (b) Valuable to assess on patients less than six years of age
         (c) Less reliable in cold environment
         (d) Blanch nailbed, base of the thumb, sole of the feet
      (3) Hydration
         (a) Skin turgor
         (b) Sunken or flat fontanelle in an infant
         (c) Presence of tears and saliva
      (4) Pulse oximetry
         (1) Should be utilized on any moderately injured or ill infant or child
         (d) Hypothermia and shock can alter reading
      (5) Cardiac monitor
6. On-going exam - continually monitor the following
   a. Respiratory effort
   b. Color
   c. Mental status
   d. Pulse oximetry
   e. Vital signs
   f. Patient temperature

C. General management
   1. Airway management in pediatric patients
      a. Basic airway management
         (1) Manual positioning
            (a) Allow medical patients to assume position of comfort
            (b) Support under the torso for trauma patients less than 3 year old
            (2) Occipital elevation for supine medical patients 3 years of age or older

(2) Foreign body airway obstruction - basic clearing methods
  (a) Infants
    i) Back blows
    ii) Chest thrusts
  (b) Children
    i) Abdominal thrusts
(3) Suction
  (a) Avoid hypoxia
  (b) Avoid upper airway stimulation
  (c) Decrease suction negative pressure (≤100 mm/Hg) in infants
(4) Oxygenation
  (a) Non-rebreather mask
  (b) Blow-by oxygen if mask is not tolerated
  (3) Utilize the parent or guardian to deliver oxygen if patient condition warrants
  (c) Maintain proper head position
(5) Oropharyngeal airway
  (a) Sizing
  (b) Preferred method of insertion uses the tongue blade to depress the tongue and jaw
(6) Nasopharyngeal airway
  (a) Sizing
  (b) No major differences in sizing or use compared to adults
(7) Ventilation
  (a) Bag size
  (b) Proper mask fit
  (c) Proper mask position and seal (E-C clamp)
  (d) Ventilate at age appropriate rate (squeeze-release-release)
  (e) Obtain chest rise with each breath
  (f) Allow adequate time for exhalation
  (g) Assess BVM ventilation
  (4) Apply cricoid pressure to minimize gastric inflation and passive regurgitation

b. Advanced airway management
(1) Foreign body airway obstruction - advanced clearing methods
  (a) Direct laryngoscopy with Magill forceps
  (b) Attempt intubation around foreign body

(c) Consider needle cricothyroidotomy per medical direction only as a last resort if complete upper airway obstruction is present

(2) Endotracheal intubation in pediatric patients
- (a) Laryngoscope and appropriate size blade
  - i) Length based resuscitation tape to determine size
  - ii) Straight blade is preferred
- (b) Appropriate size endotracheal tube and stylette
  - i) Sizing methods
    - 1) Length based resuscitation tape
    - c) Numerical formulas
    - d) Anatomical clues
  - ii) Stylette placement
- (c) Technique for pediatric intubation
- (d) Depth of insertion
- (e) Endotracheal tube securing device

(3) Needle cricothyroidotomy in pediatric patients

2. Circulation
   - a. Vascular access
     - (1) Intraosseous access in children < 6 years of age in cardiac arrest or if intravenous access fails
   - b. Fluid resuscitation
     - (1) 20 ml/kg of lactated ringer's or normal saline bolus as needed
3. Pharmacological
   - a. Rapid sequence intubation per medical direction
4. Non-pharmacological
   - a. C-spine immobilization for traumatic cause
5. Transport considerations
   - a. Appropriate mode
     - (1) Transport should not be delayed to perform procedures that can be done en route
     - (2) Proper BLS care must be performed prior to any ALS interventions
   - b. Appropriate facility
     - (1) The availability of a receiving hospital with expertise in pediatric care may improve the patient's outcome
6. Psychological support/ communication strategies
   - a. Utilize the parent/ guardian to assist in making the infant or child more comfortable

b. Encourage parents to help calm the child during painful procedures
c. Infants, toddlers, preschool and school aged patients do not like to be separated from parent/ guardian
d. Infants and children have a natural fear of strangers; for stable patients, allow them to become accustomed to you before your hands-on assessment
e. Give some control of what is going to happen to the patient (which arm to have their IV)
f. When possible and practical, physically position your face at the same level as the patient's face to facilitate communication and minimize fear
g. Use age-appropriate vocabulary
h. Keep patient warm
i. Allow child to take their favorite toy/ blanket if possible
j. Permit the child to express their feelings (e.g., fear, pain, crying,)

3. Let the child know that certain physical actions (e.g., hitting, biting, spitting) are not permitted

5. Specific pathophysiology, assessment and management
   A. Respiratory compromise
      1. Introduction
         a. Epidemiology
            (1) Incidence
            (2) Morbidity/ mortality
            (3) Risk factors
            (4) Prevention strategies
         b. Categories of respiratory compromise
            (1) Upper airway obstruction
            (2) Lower airway disease
      2. Pathophysiology
         a. Respiratory illnesses cause respiratory compromise in airway/ lung
            (1) Severity of respiratory compromise depends on extent of respiratory illness
            (3) Approach to treatment depends on severity of respiratory compromise
         b. Severity
            (1) Respiratory distress
               (a) Increased work of breathing
               (b) Carbon dioxide tension in the blood initially decreases, then increases as condition deteriorates

(c) If uncorrected, respiratory distress leads to respiratory failure

(2) Respiratory failure
- (a) Inadequate ventilation or oxygenation
- (1) Respiratory and circulatory systems are unable to exchange enough oxygen and carbon dioxide
- (b) Carbon dioxide tension in the blood increases, leading to respiratory acidosis
- (c) Very ominous condition; patient is on the verge of respiratory arrest

(3) Respiratory arrest
- (a) Cessation of breathing
- (b) Failure to intervene will result in cardiopulmonary arrest
- (c) Good outcomes can be expected with early intervention that prevents cardiopulmonary arrest

c. Assessment
- (1) Chief Complaint
- (2) History
- (3) Physical findings
  - (a) Signs and symptoms of respiratory distress
    - i) Normal mental status => irritability or anxiety
    - ii) Tachypnea
    - iii) Retractions
    - iv) Nasal flaring
    - v) Good muscle tone
    - vi) Tachycardia
    - vii) Head bobbing
    - viii) Grunting
    - ix) Cyanosis which improves with supplemental oxygen
  - (b) Signs and symptoms of respiratory failure
    - i) Irritability or anxiety ==> lethargy
    - ii) Marked tachypnea ==> bradypnea
    - iii) Marked retractions ==> agonal respirations
    - iv) Poor muscle tone
    - v) Marked tachycardia ==> bradycardia
    - vi) Central cyanosis
  - (c) Signs and symptoms of respiratory arrest
    - i) Obtunded ==> coma
    - ii) Bradypnea ==> apnea
    - iii) Absent chest wall motion

iv) Limp muscle tone
v) Bradycardia ==> asystole
vi) Profound cyanosis

(4) On-going assessment - improvement indicated by
(a) Improvement in color
(b) Improvement in oxygen saturation
(c) Increased pulse rate
(d) Increased level of consciousness

d. Management
(1) Graded approach to treatment
(2) Consider separating parent and child
(3) Airway
(a) Manage upper airway obstructions as needed
(b) Insert airway adjunct if needed
(4) Ventilation and oxygenation
(a) Respiratory distress/ early respiratory failure
i) Administer high flow oxygen
(b) Late respiratory failure/ respiratory arrest
i) BVM - ventilate patient with 100% oxygen via age- appropriate sized bag
ii) ETT - intubate patient if positive pressure ventilation does not rapidly improve patient condition
iii) Consider gastric decompression if abdominal distention is impeding ventilation
iv) Consider needle decompression per medical direction if tension pneumothorax is present
v) Consider cricothyroidotomy per medical direction only as a last resort if complete upper airway obstruction is present
(5) Circulation
(6) Supportive care
(7) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(8) Psychological support/ communication strategies

3. Upper airway obstruction
a. Croup
(1) Epidemiology
(a) Incidence
1) Very common in infants and children (6 months to 4 years of age)

(b) Risk factors
(c) Prevention strategies

(2) Pathophysiology
(2) An inflammatory process of the upper respiratory tract involving the subglottic region
(d) Main cause is viral infection of the upper airway
(e) Another form is spasmodic croup
v) Occurs mostly in the middle of the night
vi) Usually without prior upper respiratory infection

(3) Assessment
(a) Signs and symptoms of respiratory distress or failure, depending on severity, plus
i) Appears sick
ii) Stridor
iii) Barking (seal or dog-like) or brassy cough
iv) Hoarseness
v) Fever (+/-)
(b) History
i) Usually with history of upper respiratory infection in classic croup (1-2 days)
ii) Rarely progresses to respiratory failure

(4) Management
(a) Airway and ventilation
i) Humidified or nebulized oxygen
ii) Cool mist oxygen at 4-6 L/min
(b) Circulation
(c) Pharmacological
(d) Non-pharmacological
i) Keep child in position of comfort
(e) Transport considerations
(f) Psychological support/ communication strategies
i) Do not agitate the patient (no IVs, blood pressure, etc.)
1) Keep the parent/ guardian/ caregiver with the infant or child if appropriate

b. Foreign body aspiration
(1) Epidemiology
(a) Incidence
i) Usually occurs in toddlers and pre-schoolers (1 to 4 years of age, but can occur at any age)
ii) Common

(b) Risk factors
(c) Prevention strategies

(2) Pathophysiology
- (a) Partial or complete blockage of the upper airway by a foreign body
- (b) Objects are usually food (hard candy, nuts, seeds, hot dog) or small objects (coins, balloons)
- (c) If no interventions or if interventions are unsuccessful, respiratory arrest followed by cardiopulmonary arrest will ensue

(3) Assessment
- (a) Partial obstruction
  - i) Signs and symptoms of respiratory distress or failure, depending on severity, plus
    - a) Appears irritable or anxious, but not toxic
    - b) Inspiratory stridor
    - c) Muffled or hoarse voice
    - d) Drooling
    - e) Pain in throat
  - ii) History
    - 1) Usually a history of choking if observed by adult
- (b) Complete obstruction
  - i) Signs and symptoms of respiratory failure or arrest, depending on severity, plus
    - e) Appears agitated or lethargic
    - f) No or minimal air movement
  - ii) History
    - a) History often lacking
    - b) Inability to ventilate despite proper airway positioning

(4) Management
- (a) Airway and ventilation
  - i) Partial obstruction
    - a) Place patient in sitting position
    - b) Deliver oxygen by non-rebreather mask or blow-by
    - c) DO NOT ATTEMPT TO LOOK IN MOUTH

- d) Interventions other than oxygen and transport may precipitate complete obstruction
- ii) Complete obstruction
  - a) Open airway and attempt to visualize the obstruction
  - b) Sweep visible obstructions with your finger (do NOT perform blind finger sweeps)
  - c) Perform BLS FBAO maneuvers
  - d) Attempt BVM ventilations
  - e) Perform laryngoscopy if BVM is unsuccessful
  - f) Remove object if possible with pediatric Magill forceps
  - g) Intubate if possible
  - h) Continue BLS FBAO maneuvers if ALS is unsuccessful
  - i) Consider needle cricothyroidotomy per medical direction only as a last resort
- (b) Circulation
- (c) Pharmacological
- (d) Transport considerations
  - i) Notify hospital of patient status
  - ii) Transport expeditiously
- (e) Psychological support/ communication strategies
  - i) Do not agitate patient
    - a) No IVs or medications
    - b) Do not look in patient's mouth
  - ii) Keep caregiver with child, if appropriate

c. Bacterial tracheitis
- (1) Epidemiology
  - (a) Incidence
    - 2) Usually occurs in infants and toddlers (1-5 years old), but can occur in older children
    - 3) Very uncommon
  - (b) Risk factors
  - (c) Prevention strategies
- (2) Pathophysiology
  - (3) Bacterial infection of the upper airway, subglottic trachea, usually following viral croup
- (3) Assessment

(c) Signs and symptoms - respiratory distress or failure depending on severity, plus
i) Appears agitated, sick
ii) High-grade fever
iii) Inspiratory and expiratory stridor
iv) Coughing up pus/ mucous
v) Hoarse voice
vi) Pain in throat
(d) History
i) Usually a history of croup in the preceding few days
(e) May progress to respiratory failure or arrest
(4) Management
(a) Assure airway and ventilation
(b) Administer oxygen by non-rebreather or blow-by
(c) Complete obstruction or respiratory failure/ arrest
i) BVM ventilation
ii) May require high pressure to adequately ventilate
iii) Intubate patient
iv) Suction endotracheal tube to reduce pus or mucous
(d) Circulation
(e) Pharmacological
(f) Transport considerations
i) Place patient in sitting position
ii) Notify hospital of patient status as early as possible
iii) Transport quickly
(g) Psychological support/ communication strategies
1) DO NOT AGITATE THE PATIENT - no IVs, no BP, do not look in patient's mouth
iv) Keep caregiver with child if appropriate

d. Epiglottitis
(1) Epidemiology
(a) Incidence
i) Usually occurs in pre-school and school-age children (3-7 years of age) but can occur at any age
ii) Extremely uncommon due to the H. flu vaccine
(b) Risk factors

(c) Prevention strategies

(2) Pathophysiology
- (4) Rapidly forming cellulitis of the epiglottis and its surrounding structures
- (d) Bacterial infection, usually Hemophilus influenza type B
- (e) Can be a true life-threatening emergency

(3) Assessment
- (a) Signs and symptoms of respiratory distress or failure depending on severity, plus
  - i) Appears agitated, sick
  - ii) Stridor
  - iii) Muffled voice
  - iv) Drooling
  - v) Sore throat
  - vi) Pain on swallowing
  - vii) High fever
- (b) History
  - i) Usually no previous history but a rapid onset of symptoms (6-8 hours)
- (c) Can quickly progress to respiratory arrest

(4) Management
- (a) Airway and ventilation
  - i) NEVER ATTEMPT TO VISUALIZE THE AIRWAY IF THE PATIENT IS AWAKE
  - ii) Allow the parent to administer oxygen
  - iii) If airway becomes obstructed, two rescuer ventilation with BVM is almost always effective
  - iv) If BVM is not effective, attempt intubation with stylet in place
  - v) Intubation should not be attempted in settings with short transport times
  - vi) Performing chest compression upon glottic visualization during intubation may produce a bubble at the tracheal opening
  - vii) Consider needle cricothyroidotomy per medical direction as a last resort if complete upper airway obstruction is present
- (b) Circulation
- (c) Pharmacological
- (d) Transport considerations
  - i) Allow patient to assume position of comfort

ii) Notify hospital of patient status early
1) Transport to the hospital without delay, keeping child warm

(e) Psychological support/ communication strategies
i) DO NOT AGITATE THE PATIENT - no IVs, BP, do not look in patient's mouth
ii) Keep the caregiver with the child if appropriate

4. Lower airway disease
a. Asthma
(1) Epidemiology
(a) Incidence
i) Usually occurs in children older than 2 years of age
ii) Very common
(b) Risk factors
i) Typically in child with known history of asthma
2) Triggered by upper respiratory infections, allergies, changes in temperature, physical exercise and emotional response
3) Children that experience prolonged asthma attacks tire easily; watch for signs of respiratory failure
(c) Prevention strategies
(2) Pathophysiology
(a) Bronchospasm
(b) Excessive mucous production
(c) Inflammation of the small airways
(3) Assessment
(5) Signs and symptoms - respiratory distress or failure depending on severity, plus
i) Appears anxious
ii) Wheezes
iii) Prolonged expiratory phase
iv) A silent chest means danger
(d) History
i) Usually follows exposure to known trigger
(e) Bronchiolitis and asthma may present very similarly
(4) Management
(a) Airway and ventilation
i) Administer oxygen by tolerated method

ii) BVM ventilations for respiratory failure/ arrest (progressive lethargy, poor muscle tone, shallow respiratory effort)
iii) Endotracheal intubation for respiratory failure/ arrest with prolonged BVM ventilations, or inadequate response to BVM ventilations
(b) Circulation
(c) Pharmacological
i) Albuterol nebulizer
ii) Subcutaneous epinephrine 1:1000 - only with severe respiratory distress or failure
iii) Medications can be repeated if no effect
(d) Transport considerations
i) Allow patient to assume position of comfort
(e) Psychological support/ communication strategies
i) Keep caregiver with child if appropriate

b. Bronchiolitis
(1) Epidemiology
(a) Incidence
i) Usually occurs in children less than 2 years of age
ii) Very common
(b) Risk factors
i) Usually occurs in winter months
(c) Prevention strategies
(2) Pathophysiology
(6) An inflammatory process of the lower respiratory tract including the terminal airways
(7) Main cause is respiratory syncytial virus infection of the lower airway
(3) Assessment
(a) Signs and symptoms - respiratory distress or failure depending on severity, plus
i) Appears anxious
ii) Wheezing
iii) Rales (diffuse)
(b) History
i) Usually a history of upper respiratory infection symptoms
(c) Bronchiolitis and asthma may present very similarly
(4) Management
(a) Airway and ventilation

i) Administer oxygen by tolerated method
ii) BVM ventilations for respiratory failure/ arrest (progressive lethargy, poor muscle tone, shallow respiratory effort)
iii) Endotracheal intubation for respiratory failure/ arrest with prolonged BVM ventilations, or inadequate response to BVM ventilations

(b) Circulation
(c) Pharmacological
i) Albuterol nebulizer
(d) Transport considerations
i) Allow patient to assume position of comfort
(e) Psychological support/ communication strategies
i) Keep caregiver with child if appropriate

c. Pneumonia

(1) Epidemiology
(a) Incidence
1) Usually occurs in infants, toddlers and pre-schoolers (1-5 years of age), but can occur at any age
ii) Common
(b) Risk factors
(c) Prevention strategies

(2) Pathophysiology
(a) Infection of the lower airway and lung
(b) May be caused by bacteria or virus

(3) Assessment
(a) Signs and symptoms - respiratory distress or failure depending on the severity, plus
i) Appears anxious
ii) Decreased breath sounds
iii) Rales
iv) Rhonchi (localized or diffuse)
v) Pain in the chest
vi) Fever
(b) History
i) Usually a history of lower respiratory infectious symptoms

(4) Management
(a) Airway and ventilation
i) Administer oxygen by tolerated method

ii) BVM ventilations for respiratory failure/ arrest (progressive lethargy, poor muscle tone, shallow respiratory effort)
iii) Endotracheal intubation for respiratory failure, prolonged BVM ventilations, or inadequate response to BVM ventilations
(b) Circulation
(c) Pharmacological
(d) Transport considerations
i) Allow patient to assume position of comfort
(e) Psychological support/ communication strategies
i) Keep caregiver with child if appropriate

d. Foreign body lower airway obstruction
(1) Epidemiology
(a) Incidence
i) Usually occurs in toddlers and preschool age children (1-4 years of age), but can occur at any age
ii) Uncommon
(b) Risk factors
(c) Prevention strategies
(2) Pathophysiology
(a) Foreign body in the lower airway or lung
(b) Objects are usually food (nuts, seeds, etc.) or small objects
(3) Assessment
(a) Signs and symptoms - respiratory distress of failure depending on the severity, plus
i) Appears anxious
ii) Decreased breath sounds
iii) Rales
iv) Rhonchi (localized or diffuse)
v) Pain in the chest
(b) History
i) May be a history of choking if witnessed by an adult
(4) Management
(a) Airway and ventilation
i) Administer oxygen by tolerated method
2) BVM ventilations for respiratory failure/ arrest (progressive lethargy, poor muscle tone, shallow respiratory effort)

3) Endotracheal intubation for respiratory failure/ arrest with prolonged BVM ventilations, or inadequate response to BVM ventilations
4) Do not attempt to retrieve foreign body as it is beyond the reach of Magill forceps

(b) Circulation
(c) Transport considerations
i) Allow patient to assume position of comfort
(d) Psychological support/ communication strategies
i) Keep caregiver with child if appropriate

B. Shock
1. Introduction
a. Epidemiology
(1) Incidence
(2) Morbidity/ mortality
(3) Risk factors
(4) Prevention strategies
b. Categories of shock
(1) Non-cardiogenic
(2) Cardiogenic
2. Pathophysiology
a. An abnormal condition characterized by inadequate delivery of oxygen and metabolic substrates to meet the metabolic demands of tissues
b. Severity
(1) Compensated (early)
(8) Patient's blood pressure is normal although signs of inadequate tissue perfusion are present
(e) Reversible
(2) Decompensated (late)
(a) Hypotension and signs of inadequate organ perfusion are present
(b) Often irreversible
c. Assessment
(1) Chief complaint
(2) History
(3) Physical findings
(a) Signs and symptoms of compensated shock
i) Irritability or anxiety
ii) Tachycardia
iii) Tachypnea
iv) Weak peripheral pulses, full central pulses

v) Delayed capillary refill
vi) Cool, pale extremities
vii) Systolic blood pressure within normal limits
viii) Decreased urinary output

(b) Signs and symptoms of decompensated shock
i) Lethargy or coma
ii) Marked tachycardia or bradycardia
iii) Marked tachypnea or bradypnea
iv) Absent peripheral pulses, weak central pulses
v) Markedly delayed capillary refill
vi) Cool, pale, dusky, mottled extremities
vii) Hypotension
viii) Markedly decreased urinary output

d. Management
(1) Graded approach to treatment
(2) Consider separating parent and child
(3) Airway
(a) Trauma - immobilize c-spine
(4) Ventilation and oxygenation
(a) Compensated shock
i) Oxygen
(b) Decompensated shock
i) BVM - consider ventilating patient with 100% oxygen via appropriate-sized bag
ii) ETT - consider intubating patient if positive pressure ventilation does not rapidly improve patient's condition
(5) Circulation
(a) Compensated shock
i) Oxygen
(b) Decompensated shock
i) Non-cardiogenic
a) Fluid
ii) Cardiogenic
a) No fluid
b) Dysrhythmia management as indicated
(6) Supportive care
(7) Transport considerations
(a) Appropriate mode
(b) Appropriate facility
(8) Psychological support/ communication strategies

3. Noncardiogenic

a. Hypovolemia
   (1) Epidemiology
      (a) Common
   (2) Pathophysiology
      (a) Intravascular volume depletion
         i) Severe dehydration
            a) Vomiting
            b) Diarrhea
         ii) Blood loss
            a) Trauma
            b) Other, e.g., GI bleed
   (3) Assessment
      (a) Signs and symptoms of compensated or decompensated shock depending on severity, plus
         i) Blood loss
            a) External hemorrhage
            b) Major trauma
         ii) Dehydration
            a) Poor skin turgor
            b) Decreased saliva and or tears
            c) Sunken fontanelle (infants)
      (b) History
   (4) Management
      (a) Airway and ventilation
         i) Oxygen
         ii) Trauma - immobilize c-spine
      (b) Circulation
         i) Compensated shock
            a) Oxygen
         ii) Decompensated shock
            a) Oxygen
            b) Vascular access
               1) 20 ml/kg of lactated ringers or NS bolus as needed
      (c) Supportive care
      (d) Transport considerations
      (e) Psychological support/ communication strategies
b. Distributive
   (1) Epidemiology
      (a) Uncommon
   (2) Etiology
      (a) Septic

(b) Neurogenic
(c) Anaphylactic
(3) Pathophysiology
(a) Peripheral pooling due to loss of vasomotor tone
(4) Assessment
(9) Signs and symptoms of compensated or decompensated shock depending on severity, plus
i) Septic
a) Early - warm skin
b) Late - cool skin
ii) Neurogenic
a) Warm skin
b) Bradycardia
iii) Anaphylactic
a) Allergic rash
b) Airway swelling
(b) History
(5) Management
(a) Airway and ventilation
i) Oxygen
ii) Trauma - immobilize c-spine
(b) Circulation
i) Compensated shock
a) Oxygen
ii) Decompensated shock
a) Oxygen
b) Vascular access
1) 20 ml/kg of lactated ringers or NS bolus as needed
c) Anaphylactic - secure airway
(c) Supportive care
(d) Transport considerations
(e) Psychological support/ communication strategies

4. Cardiogenic
a. Cardiomyopathy
(1) Epidemiology
(a) Infection
(b) Congenital abnormalities
(2) Pathophysiology
(a) Mechanical pump failure
(b) Usually biventricular
(3) Assessment

(a) Signs and symptoms of compensated or decompensated shock, depending on severity, plus
i) Rales
ii) Jugular venous distention
iii) Hepatomegaly
iv) Peripheral edema
(b) History
(4) Management
(a) Airway and ventilation
i) Oxygen
(b) Circulation
i) Compensated shock
a) Oxygen
ii) Decompensated shock
a) Oxygen
b) Vascular access
c) Restrict fluid
d) Consider diuretic
e) Consider vasopressor
(c) Supportive care
(d) Transport considerations
(e) Psychological support/ communication strategies
b. Dysrhythmias
(1) Epidemiology
(a) Bradydysrhythmias - common
(b) Supraventricular tachydysrhythmias - uncommon
(c) Ventricular tachydysrhythmias - very uncommon
(2) Pathophysiology
(a) Electrical pump failure
(10) Results in cardiogenic shock or cardiopulmonary arrest depending on type
(3) Assessment
(11) Signs and symptoms of cardiogenic shock (compensated or decompensated) or cardiopulmonary arrest, depending on type
(b) History
(4) Management
(a) Specific to each type

C. Dysrhythmias
1. Tachydysrhythmias
a. Supraventricular tachycardia
(1) Epidemiology

(a) Incidence
i) Usually in infants with no prior history
(b) Risk factors
(c) Prevention strategies
(2) Pathophysiology
(12) Stable (compensated shock) - patient will usually remain stable during transport with oxygen
(d) Unstable (decompensated shock) - PATIENT REQUIRES IMMEDIATE TREATMENT
(e) Children may be able to sustain increased rates for a while, but after several hours, they will decompensate
(3) Assessment
(a) Signs and symptoms - compensated or decompensated shock, depending on severity, plus
i) Narrow complex tachycardia with rates of greater than 220 beats per minute (too fast to count)
ii) Poor feeding
iii) Hypotension
(b) History
(4) Management
(a) Stable - supportive care
(b) Unstable
i) Airway and ventilation
a) Oxygen
ii) Circulation
iii) Pharmacological
a) Consider adenosine
iv) Non-pharmacological
a) Synchronized cardioversion
v) Transport considerations
vi) Psychological support/ communication strategies

b. Ventricular tachycardia with a pulse
(1) Epidemiology
(a) Incidence
(b) Risk factors
(c) Prevention strategies
(2) Pathophysiology
(13) Stable (compensated shock) - patient will usually not tolerate for long periods of time

(d) Unstable (decompensated shock) - PATIENT REQUIRES IMMEDIATE TREATMENT
(e) Most VT with a pulse is secondary to structural heart disease and responds poorly to lidocaine

(3) Assessment
(a) Signs and symptoms - signs of compensated or decompensated shock, depending on severity, plus
i) Rapid, wide complex tachycardia
ii) Poor feeding
iii) Hypotension
(b) History
(4) Management
(a) Stable - supportive care
(b) Unstable
i) Airway and ventilation
a) Administer high flow oxygen
ii) Circulation
iii) Pharmacological
a) Consider lidocaine
iv) Non-pharmacological
a) Synchronized cardioversion
v) Transport considerations
vi) Psychological support/ communication strategies

2. Bradydysrhythmias
a. Epidemiology
(1) Incidence - most common dysrhythmia in children
(2) Risk factors
(3) Prevention strategies
b. Pathophysiology
(1) Usually develops as a result of hypoxia
(2) May develop due to vagal stimulation (rare)
c. Assessment
(1) Signs and symptoms - compensated or decompensated shock, depending on severity, plus
(a) Bradycardia
(b) Slow, narrow complex heart rhythm, QRS duration may be normal or prolonged
(2) History
d. Management
(1) Stable - supportive care
(2) Unstable

(a) Airway and ventilation
i) Ventilate patient with 100% oxygen via BVM
ii) Intubate patient if poor response to BVM ventilations
(b) Circulation
i) Perform chest compressions if oxygen does not increase heart rate
(c) Pharmacological
i) Medications can be given down the endotracheal tube
ii) Administer epinephrine
iii) Administer atropine for vagally induced bradycardia
(d) Non-pharmacological
(e) Transport considerations
(f) Psychological support/ communication strategies

2. Absent rhythm
a. Asystole
(1) Epidemiology
(a) Incidence - may be the initial cardiac arrest rhythm
(b) Risk factors
(c) Prevention strategies
(2) Pathophysiology
(a) Bradycardias may degenerate into asystole
(b) High mortality rate
(3) Assessment
(a) Signs and symptoms
i) Pulseless
ii) Apneic
iii) Cardiac monitor indicating no electrical activity
(b) History
(4) Management
(a) Confirm in two leads
(b) Airway and ventilation
i) Ventilate the patient with 100% oxygen via BVM
ii) Intubate patient if poor response to BVM ventilations
(c) Circulation
i) Perform chest compressions

(d) Pharmacological
i) Medications can be given down the endotracheal tube
ii) Administer epinephrine
(e) Non-pharmacological
(f) Transport considerations
(g) Psychological support/ communication strategies

b. Ventricular fibrillation/ pulseless ventricular tachycardia
(1) Epidemiology
(a) Incidence - rare
(b) Risk factors
(c) Prevention strategies
(2) Pathophysiology
(a) Possibly due to electrocution and drug overdoses
(b) High mortality rate
(3) Assessment
(a) Signs and symptoms
i) Pulseless
ii) Apneic
1) Cardiac monitor indicating no organized electrical activity or rapid wide complex tachycardia
(b) History
(4) Management
(a) Unmonitored - perform basic life support
(b) Monitored - defibrillate up to three consecutive shocks
(c) Airway and ventilation
i) Ventilate the patient with 100% oxygen via BVM
ii) Intubate patient if poor response to BVM ventilations
(d) Circulation
i) Perform chest compressions
(e) Pharmacological
i) Medications can be given down the endotracheal tube
ii) Administer epinephrine
iii) Administer lidocaine
iv) Administer bretylium

2) After administration of a medication, allow it to circulate for one minute before repeat defibrillation
(f) Non-pharmacological
(g) Transport considerations
(h) Psychological support/ communication strategies

c. Pulseless electrical activity
(1) Epidemiology
(a) Incidence - look for a treatable cause
(b) Risk factors
(c) Prevention strategies
(2) Pathophysiology
(a) Pneumothorax
(b) Cardiac tamponade
(c) Hypovolemia
(d) Hypoxia
(e) Acidosis
(f) Hypothermia
(g) Hypoglycemia
(3) Assessment
(a) Signs and symptoms
i) Pulseless
ii) Apneic
iii) Cardiac monitor indicating organized electrical activity
(b) History
(4) Management
(a) Resuscitation should be directed toward relieving cause
(b) Airway and ventilation
i) Ventilate the patient with 100% oxygen
ii) Intubate patient
(c) Circulation
i) Perform chest compressions
(d) Pharmacological
i) Medications can be given down the endotracheal tube
ii) Administer epinephrine
(e) Non-pharmacological
(f) Transport considerations
(g) Psychological support/ communication strategies

D. Seizure

1. Epidemiology
   a. Incidence
   b. Morbidity/ mortality
   c. Risk factors
   d. Prevention strategies
2. Pathophysiology
   a. Types
      (1) Generalized
      (2) Focal
   2. See neonatal section for a more specific listing of signs and symptoms
3. Assessment
   a. Signs and symptoms
      (1) Generalized
         (a) Sudden jerking of both sides of the body followed by tenseness and relaxation of the body
      (1) Loss of consciousness
   (2) Focal
      (1) Sudden jerking of a part of the body (arm, leg)
      (2) Lip smacking
      (3) Eye blinking
      (4) Staring
      (5) Confusion
      (6) Lethargy
   b. History
4. Management
   a. Airway and ventilation
      (1) Maintain patent airway
      (2) Administer high-flow oxygen
   b. Circulation
   c. Pharmacological
      (1) Consider dextrose if hypogylcemic
      (3) Consider benzodiazepine if active seizures are present; anticipate need for ventilatory support
   d. Non-pharmacological
      (1) Protect patient from further injury
      (2) Protect head and cervical spine if injury has occurred
   e. Transport considerations
   f. Psychological support/ communication strategies

E. Hypoglycemia
1. Epidemiology
   a. Incidence

b. Morbidity/ mortality
c. Incidence
d. Risk factors
e. Prevention strategies

2. Pathophysiology
   a. Children have limited glucose storage
   b. In severe cases, if not treated promptly, can cause brain damage
3. Assessment
   a. Signs and symptoms
      (1) Mild
         (a) Hunger
         (b) Weakness
         (c) Tachypnea
         (d) Tachycardia
      (2) Moderate
         (a) Sweating
         (b) Tremors
         (c) Irritability
         (d) Vomiting
         (e) Mood swings
         (f) Blurred vision
         (g) Stomach ache
         (h) Headache
         (i) Dizziness
      (3) Severe
         (a) Decreased level of consciousness
         (b) Seizure
   b. Measure blood glucose
   c. History
4. Management
   a. Airway and ventilation
   b. Circulation
   c. Pharmacological
      (1) Administer Dextrose per medical direction
      (4) Administer Glucagon IM if IV access is not possible per medical direction
      (2) Repeat blood glucose test 10-15 minutes after dextrose infusion
   d. Non-pharmacological
   e. Transport considerations
   f. Psychological support communication strategies

F. Hyperglycemia

1. Epidemiology
   a. Morbidity/ mortality
   b. Incidence
   c. Risk factors
   d. Prevention strategies
2. Pathophysiology
   a. Hyperglycemia leads to dehydration and ketoacidosis
3. Assessment
   a. Signs and symptoms
      (1) Early
         (a) Increased thirst
         (b) Increased urination
         (c) Weight loss
      (2) Late (dehydration and early ketoacidosis)
         (a) Weakness
         (b) Abdominal pain
         (c) Generalized aches
         (d) Loss of appetite
         (e) Nausea
         (f) Vomiting
         (g) Signs of dehydration except decreased urinary output
         (h) Fruity breath odor
         (i) Tachypnea
         (j) Hyperventilation
         (k) Tachycardia
      (3) If untreated, progresses to
         (a) Coma
         (b) Deep and slow respirations (Kussmaul)
         (c) Signs of severe dehydration
   b. Measure blood glucose
   c. History
4. Management
   a. Airway and ventilation
   b. Circulation
   c. Pharmacological
      (5) Consider lactated ringers or NS if signs of dehydration are present per medical direction
   d. Non-pharmacological
   e. Transport considerations
   f. Psychological support communication strategies

2. Infection

1. Epidemiology
   a. Incidence
   b. Morbidity/ mortality
   c. Risk factors
   d. Prevention strategies
2. Pathophysiology
   a. Depends upon the type of infectious organism and extent of infection
3. Assessment
   a. Signs and symptoms vary depending upon the infection and the time since the patient was exposed
      (3) Fever
      (4) Chills
      (5) Tachycardia
      (6) Cough
      (7) Sore throat
      (8) Nasal congestion
      (9) Malaise
      (10) Tachypnea
      (11) Cool or clammy skin
      (12) Petechia
      (13) Respiratory distress
      (14) Poor feeding
      (15) Vomiting
      (16) Diarrhea
      (17) Dehydration
      (18) Hypoperfusion
      (19) Purpura
      (20) Seizures
      (21) Severe headache
      (22) Irritability
      (23) Stiff neck
      (24) Bulging fontanelle (infant)
   b. History
4. Management
   a. Body substance isolation precautions must be strictly adhered to due to the unknown etiology of the infection
   b. Airway and ventilation
      (1) Administer high-flow oxygen
      (2) Provide ventilatory support if indicated
   c. Circulation
   d. Pharmacological

(1) Administer lactated ringers or NS if signs of decompensated shock are present per medical direction
(2) Administer benzodiazepine per medical direction if active seizure is present

e. Non-pharmacological
f. Transport considerations
g. Psychological support communication strategies

G. Poisoning and toxic exposure
1. Epidemiology
a. Incidence
(1) Children account for the majority of poisoning events
b. Morbidity/ mortality
(1) Major cause of preventable death in children under five years of age
c. Risk factors
d. Prevention strategies
2. Pathophysiology
a. Depends upon the type of poison or toxin and the extent of exposure
3. Common substances of pediatric poisonings
a. Alcohol, barbiturates, sedatives
b. Amphetamines, cocaine, hallucinogens
c. Anticholinergic
d. Aspirin
e. Corrosives
f. Digitalis, beta-blockers
g. Hydrocarbons
h. Narcotics
i. Organic solvents (inhaled)
j. Organophosphate
4. Assessment
1. Signs and symptoms - vary depending upon both the poisoning/ toxic substance and the time since the child was exposed
(1) Respiratory system depression
(2) Circulatory system depression
(3) Central nervous system stimulation or depression
(4) Mind-altering ability
(5) Gastrointestinal system irritation
k. History
5. Management
a. Airway and ventilation
b. Circulation

c. Pharmacological
   (1) Contact poison control center or medical direction to obtain directions for specific treatment
d. Non-pharmacological
   (1) Take pills, substances, containers to the hospital
e. Transport considerations
f. Psychological support communication strategies

6. Pediatric trauma
   A. Pathophysiology
      1. Blunt
         a. Thinner body wall allows forces to be readily transmitted to body contents
         b. Predominant cause of injury in children
      2. Penetrating
         a. Becoming an increasing problem in adolescents
         b. Higher incidence in the inner city (mostly intentional), but significant incidence in other areas (mostly unintentional)
   B. Mechanism of injury
      1. Fall
         a. Single most common cause of injury in children
         b. Serious injury or death resulting from truly accidental falls is relatively uncommon unless from a significant height
         c. Prevention strategies
      2. Motor vehicle crash
         a. Leading cause of permanent brain injury and new cases of epilepsy
         b. Leading cause of death and serious injury in children
         c. Prevention strategies
      3. Pedestrian vehicle crash
         a. Particularly lethal form of trauma in children
         b. Initial injury due to impact with vehicle (extremity/ trunk)
         c. Child is thrown from force of impact causing additional injury (head/ spine) upon impact with other objects (ground, another vehicle, light standard, etc.)
         d. Prevention strategies
      4. Near-drowning
         a. Third leading cause of injury or death in children between birth and 4 years of age
         b. Causes approximately 2000 deaths annually
         c. Severe, permanent brain damage occurs in 5-20% of hospitalized children for near drowning

d. Prevention strategies

5. Penetrating injuries
   a. Risk of death from firearm injuries increase with age
   b. Stab wounds and firearm injuries account for approximately 10-15% of all pediatric trauma admissions
   c. Visual inspection of external injuries can not evaluate the extent of internal involvement
   d. Prevention strategies
6. Burns
   a. The leading cause of accidental death in the home for children under the age of 14 years
   b. Burn survival is a function of burn size and concomitant injuries
   1. Modified “rule of nines” is utilized to determine percentage of surface area involved
   c. Prevention strategies
7. Physical abuse
   a. Has been classified into four categories - physical abuse, sexual abuse, emotional abuse and child neglect
   b. Social phenomena such as increased poverty, domestic disturbance, younger aged parents, substance abuse, and community violence have been attributed to increase of abuse
   c. Document all pertinent findings, treatments and interventions
   d. Prevention strategies

C. Special considerations
1. Airway control
   a. Maintain in-line stabilization in neutral, not sniffing position
   b. Administer 100% oxygen to all trauma patients
   c. Patent airway must be maintained via suctioning and jaw thrust
   d. Be prepared to assist ineffective respirations
   e. Intubation should be performed when the airway remains inadequate
   f. Gastric tube should be placed after intubation
   g. Needle cricothyroidotomy is rarely indicated for traumatic upper airway obstruction
2. Immobilization
   a. Indications for stabilization and immobilization of cervical spine
   b. Utilize appropriate sized pediatric immobilization equipment
      (1) Rigid cervical collar
      (2) Towel/ blanket roll
      (3) Child safety seat
      (4) Pediatric immobilization device
      (5) Vest-type/ short wooden backboard

(6) Long backboard
(7) Straps, cravats
(8) Tape
(9) Padding

2. Maintain supine neutral in-line position for infants, toddlers, and pre-schoolers by placing padding from the shoulders to the hips

3. Fluid management
   a. Management of the airway and breathing take priority over management of circulation because circulatory compromise is less common in children than adults
   b. Vascular access
      (1) Large-bore intravenous catheter should be inserted into a large peripheral vein
      (2) Do not delay transport to gain access
      (3) Intraosseous access in children < 6 years of age if intravenous access fails
      (4) Initial fluid bolus of 20 ml/kg of an lactated ringers or NS
      (5) Reassess vital signs and rebolus with 20 ml/kg if no improvement
      (6) If improvement does not occur after the second bolus, there is likely to be significant blood loss and the need for rapid surgical intervention

4. Traumatic brain injury
   a. Early recognition and aggressive management can reduce mortality and morbidity
   b. Severity
      (1) Mild - GCS is 13 to 15
      (2) Moderate - GCS is 9 to 12
      (3) Severe - GCS is less than or equal to 8
   c. Signs of increased intracranial pressure
      (1) Elevated blood pressure
      (2) Bradycardia
      (1) Rapid deep respirations (Kussmaul) progressing to slow, deep respirations alternating with rapid deep respirations (Cheyne-Stokes)
      (3) Bulging fontanelle (infant)
   d. Signs of herniation
      (1) Asymmetrical pupils
      (2) Posturing
   e. Specific management
      (1) Administer high concentration of oxygen for mild to moderate head injuries (GCS 9-15)

(2) Intubate and ventilate at normal breathing rate with 100% oxygen for severe head injuries (GCS 3-8)
(a) Use of lidocaine may blunt rise in ICP (controversial)
(b) Consider RSI per medical direction
(3) Indications for hyperventilation
(a) Asymmetric pupils
(b) Active seizures
(c) Neurologic posturing

D. Specific injuries
1. Head and neck injury
a. Larger relative mass of the head and lack of neck muscle strength provides increased momentum in acceleration-deceleration injuries and a greater stress to the cervical spine region
b. Fulcrum of cervical mobility in the younger child is at the C2-C3 level
c. 60% to 70% of pediatric fractures occur in C1 or C2
d. Head injury is the most common cause of death in pediatric trauma victim
e. Diffuse injuries are common in children, focal injuries are rare
f. Soft tissues, skull and brain are more compliant in children than in adults
3. Due to open fontanelles and sutures, infants up to an average age of 16 months may be more tolerant to an increase of intracranial pressure and can have delayed signs
g. Subdural bleeds in a infant can produce hypotension (extremely rare)
h. Significant blood loss can occur through scalp lacerations and should be controlled immediately
i. The Modified Glasgow Coma scale should be utilized for infants and young children
2. Chest injury
a. Chest injuries in children under 14 years of age are usually the result of blunt trauma
b. Due to the compliance of the chest wall, severe intrathoracic injury can be present without signs of external injury
c. Tension pneumothorax is poorly tolerated and is an immediate threat to life
d. Flail segment is an uncommon injury in children; when noted without a significant mechanism of injury, suspect child abuse
e. Many children with cardiac tamponade will have no physical signs of tamponade other then hypotension
3. Abdominal injury

a. Musculature is minimal and poorly protects the viscera
b. Organs most commonly injured are liver, kidney and spleen
c. Onset of symptoms may be rapid or gradual
d. Due to the small size of the abdomen, be certain to palpate only one quadrant at a time

4. Any child who is hemodynamically unstable without evidence of obvious source of blood loss should be considered as having an abdominal injury until proven otherwise

4. Extremity
   a. Relatively more common in children than adults
   b. Growth plate injuries are common
   c. Compartment syndrome is an emergency in children
   d. Any sites of active bleeding must be controlled
   e. Splinting should be performed to prevent further injury and blood loss
   f. PASG may be useful in unstable pelvic fractures with hypotension
5. Burns
   a. Thermal burns in children
   b. Chemical burns in children
   c. Electrical burns in children
   d. Management priorities
      (1) Prompt management of the airway is required as swelling can develop rapidly
      (2) If intubation is required, an endotracheal tube up to two sizes smaller than what would normally be used may be required
      (3) Thermally burned children are very susceptible to hypothermia; maintain normal body temperature
      (4) Suspect musculoskeletal injuries in electrical burn patients and perform spine immobilization techniques

7. Sudden Infant Death Syndrome (SIDS)
   A. Epidemiology
      1. Incidence
      2. Morbidity/ mortality
      3. Risk factors
         a. Occurs most frequently in the fall and winter months
         b. Minor illness (cold or upper respiratory infection) within two weeks prior to the death
         c. Premature and low birth-weight infants
         d. Infants of young mothers
         e. Infants of mothers who did not receive prenatal care

f. Infants of mothers who used cocaine, methadone or heroin during pregnancy

4. Prevention strategies

B. Pathophysiology
1. Sudden and unexpected death of a seemingly healthy infant, which remains unexplained even after a thorough postmortem examination
2. No prior symptoms of life-threatening illness
3. Death usually occurs during sleep
4. No definitive answer at this time
5. A small percentage is abuse related
6. Many victims of SIDS appear to have suffered from long-term underventilation of the lungs, possibly due to poor control of breathing during sleep; prone positioning may be a factor
7. Abnormalities in the brainstem

C. Assessment
1. Signs and symptoms
a. No external signs of injury
b. Lividity
c. Frothy blood-tinged drainage from nose/ mouth
d. Rigor mortis
e. Evidence that the baby was very active just prior to the death (i.e. rumpled bed clothes, unusual position or location in the bed)
2. History

D. Management
1. Airway and ventilation
2. Circulation
3. Pharmacological
4. Non-pharmacological
5. Transport considerations
6. Psychological support/ communication strategies
a. Initiate CPR unless the infant is obviously dead (unquestionably dead to a lay person)
b. Perform ALS as indicated
c. Be prepared for the range of possible family emotional reactions
d. Parents/ caregiver should be allowed to accompany their baby in the ambulance
e. Explain that certain information is required regarding the infant's health is necessary to determine the care to be given
f. Utilize the baby's name
g. Questions should be phrased so blame is not implied
h. Debriefing
i. Resources for SIDS families

8. Child abuse and neglect
   - A. Epidemiology
     1. Second leading cause of death in infants less than 6 months of age
     2. Between 2000 and 5000 children die each year due to abuse and neglect
   - B. Age considerations
     1. Under 18 years of age
     2. Physically or mentally handicapped person under 21 years of age
   - C. Abuse or neglect perpetrators
     1. Parent, legal guardian, foster parent
     2. Person, institution, agency or program having custody of the child
     3. Person serving as a caretaker, i.e. babysitter
   - D. Abuse
     1. Types
        a. Physical
        b. Emotional
        c. Sexual
     2. Abuse indicators
        a. Historical
        b. Psychosocial
        c. Signs of physical abuse
        d. Signs of emotional abuse
           (1) Physical indicators
           (2) Behavioral indicators
        e. Signs of sexual abuse
   - E. Neglect
     1. Types
        a. Physical
        b. Emotional
     2. Neglect indicators
        a. Behavioral
        b. Physical
   - F. Paramedic role in treating abuse and neglect
     1. Assess the injuries/ neglect and render appropriate care
     2. Look at the environment for condition and cleanliness
     3. Look for evidence of anything out of the ordinary
     4. Look and listen to caregiver/ family members
     5. Assess whether the explanation fits the injury
     6. Document all findings thoroughly
     7. Report suspicion
        a. Mandated reporter
        b. Immunity from liability

G. Resources for abuse and neglect
   1. State, regional and local child protection agency
   2. Hospital social service department

9. Infants and children with special needs
   A. This can include many different types of children
      1. Premature babies
      2. Lung disease
      3. Heart diseases
      4. Neurological diseases
      5. Chronic diseases
      6. Altered functions from birth
   B. Often these children will be at home, technologically dependent
      1. Tracheostomy tube
         a. Types
         b. Complications
            (1) Obstruction
            (2) Bleeding
            (3) Air leak
            (4) Dislodged
            (5) Infection
         c. Treatment
            (1) Maintain an open airway
            (2) Suction
            (3) Maintain position of comfort
            (4) Intubation
               (a) Intubate orally in the absence of upper airway obstruction
               (b) Intubate via the stoma if there is an upper airway obstruction
            (5) Transport
      2. Home artificial ventilators
         a. Types
            (1) Parents are usually familiar with the operation
         b. Treatment
            (1) Assure airway
            (2) Artificially ventilate with oxygen
            (3) Transport
      3. Central venous lines
         a. Intravenous lines that are placed near the heart for long term use
         b. Complications
            (1) Cracked line

(2) Infection
(3) Clots
(4) Bleeding
(5) Air embolism

c. Treatment
(1) If cracked line, clamp between crack and patient
(1) If altered mental status following cracked line, position on left side with head down
(2) If bleeding, apply pressure

d. Transport

4. Gastrostomy tubes and gastric feeding
a. Tubes placed directly into stomach for feeding
b. Come in many shapes
c. Patients usually cannot be fed by mouth
d. Be alert for breathing problems
e. Treatment
(1) Assure adequate airway
(2) Administer 100% oxygen
(3) Suction if needed
(4) Consider hypoglycemia in diabetic patient who cannot be fed
f. Transport
(1) Sitting
(2) Lying on right side, head elevated

5. Shunts
a. Device running from the brain to abdomen to drain excess cerebral spinal fluid
(1) Will find a reservoir on the side of the skull
(2) Change in mental status
(3) Prone to respiratory arrest
b. Treatment
(1) Manage airway
(2) Assure adequate artificial ventilation
c. Transport
(1) Keep head elevated if possible

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UNIT TERMINAL OBJECTIVE

6-3 At the completion of this unit, the paramedic student will be able to integrate the pathophysiological principles and the assessment findings to formulate and implement a treatment plan for the geriatric patient.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

6-3.1 Discuss population demographics demonstrating the rise in elderly population in the U.S. (C-1)
6-3.2 Discuss society's view of aging and the social, financial, and ethical issues facing the elderly. (C-1)
6-3.3 Assess the various living environments of elderly patients. (C-3)
6-3.4 Describe the local resources available to assist the elderly and create strategies to refer at risk patients to appropriate community services. (C-3)
6-3.5 Discuss issues facing society concerning the elderly. (C-1)
6-3.6 Discuss common emotional and psychological reactions to aging to include causes and manifestations. (C-1)
6-3.7 Apply the pathophysiology of multi-system failure to the assessment and management of medical conditions in the elderly patient. (C-2)
6-3.8 Discuss the problems with mobility in the elderly and develop strategies to prevent falls. (C-1)
6-3.9 Discuss the implications of problems with sensation to communication and patient assessment. (C-2)
6-3.10 Discuss the problems with continence and elimination and develop communication strategies to provide psychological support. (C-3)
6-3.11 Discuss factors that may complicate the assessment of the elderly patient. (C-1)
6-3.12 Describe principles that should be employed when assessing and communicating with the elderly. (C-1)
6-3.13 Compare the assessment of a young patient with that of an elderly patient. (C-3)
6-3.14 Discuss common complaints of elderly patients. (C-1)
6-3.15 Compare the pharmacokinetics of an elderly patient to that of a young adult. (C-2)6-3.
6-3.16 Discuss the impact of polypharmacy and medication non-compliance on patient assessment and management. (C-1)
6-3.17 Discuss drug distribution, metabolism, and excretion in the elderly patient. (C-1)
6-3.18 Discuss medication issues of the elderly including polypharmacy, dosing errors and increased drug sensitivity. (C-1)
6-3.19 Discuss the use and effects of commonly prescribed drugs for the elderly patient. (C-1)
6-3.20 Discuss the normal and abnormal changes with age of the pulmonary system. (C-1)
6-3.21 Describe the epidemiology of pulmonary diseases in the elderly, including incidence, morbidity/ mortality, risk factors, and prevention strategies for patients with pneumonia, chronic obstructive pulmonary diseases and pulmonary embolism. (C-1)
6-3.22 Compare and contrast the pathophysiology of pulmonary diseases in the elderly with that of a younger adult, including pneumonia, chronic obstructive pulmonary diseases, and pulmonary embolism. (C-3)
6-3.23 Discuss the assessment of the elderly patient with pulmonary complaints, including pneumonia, chronic obstructive pulmonary diseases, and pulmonary embolism. (C-1)
6-3.24 Identify the need for intervention and transport of the elderly patient with pulmonary complaints. (C-1)
6-3.25 Develop a treatment and management plan of the elderly patient with pulmonary complaints, including pneumonia, chronic obstructive pulmonary diseases, and pulmonary embolism. (C-3)
6-3.26 Discuss the normal and abnormal cardiovascular system changes with age. (C-1)

6-3.27 Describe the epidemiology for cardiovascular diseases in the elderly, including incidence, morbidity/ mortality, risk factors, and prevention strategies for patients with myocardial infarction, heart failure, dysrhythmias, aneurism, and hypertension. (C-1)

6-3.28 Compare and contrast the pathophysiology of cardiovascular diseases in the elderly with that of a younger adult, including myocardial infarction, heart failure, dysrhythmias, aneurism, and hypertension. (C-3)

6-3.29 Discuss the assessment of the elderly patient with complaints related to the cardiovascular system, including myocardial infarction, heart failure, dysrhythmias, aneurism, and hypertension. (C-1)

6-3.30 Identify the need for intervention and transportation of the elderly patient with cardiovascular complaints. (C-1)

6-3.31 Develop a treatment and management plan of the elderly patient with cardiovascular complaints, including myocardial infarction, heart failure, dysrhythmias, aneurism and hypertension. (C-3)

6-3.32 Discuss the normal and abnormal changes with age of the nervous system. (C-1)

6-3.33 Describe the epidemiology for nervous system diseases in the elderly, including incidence, morbidity/ mortality, risk factors, and prevention strategies for patients with cerebral vascular disease, delirium, dementia, Alzheimer's disease and Parkinson's disease. (C-1)

6-3.34 Compare and contrast the pathophysiology of nervous system diseases in the elderly with that of a younger adult, including cerebral vascular disease, delirium, dementia, Alzheimer's disease and Parkinson's disease. (C-3)

6-3.35 Discuss the assessment of the elderly patient with complaints related to the nervous system, including cerebral vascular disease, delirium, dementia, Alzheimer's disease and Parkinson's disease. (C-1)

6-3.36 Identify the need for intervention and transportation of the patient with complaints related to the nervous system. (C-1)

6-3.37 Develop a treatment and management plan of the elderly patient with complaints related to the nervous system, including cerebral vascular disease, delirium, dementia, Alzheimer's disease and Parkinson's disease. (C-3)

6-3.38 Discuss the normal and abnormal changes of the endocrine system with age. (C-1)

6-3.39 Describe the epidemiology for endocrine diseases in the elderly, including incidence, morbidity/ mortality, risk factors, and prevention strategies for patients with diabetes and thyroid diseases. (C-1)

6-3.40 Compare and contrast the pathophysiology of diabetes and thyroid diseases in the elderly with that of a younger adult. (C-3)

6-3.41 Discuss the assessment of the elderly patient with complaints related to the endocrine system, including diabetes and thyroid diseases. (C-1)

6-3.42 Identify the need for intervention and transportation of the patient with endocrine problems. (C-1)

6-3.43 Develop a treatment and management plan of the elderly patient with endocrine problems, including diabetes and thyroid diseases. (C-3)

6-3.44 Discuss the normal and abnormal changes of the gastrointestinal system with age. (C-1)

6-3.45 Discuss the assessment of the elderly patient with complaints related to the gastrointestinal system. (C-1)

6-3.46 Identify the need for intervention and transportation of the patient with gastrointestinal complaints. (C-1)

6-3.47 Develop and execute a treatment and management plan of the elderly patient with gastrointestinal problems. (C-3)

6-3.48 Discuss the assessment and management of an elderly patient with GI hemorrhage and bowel obstruction. (C-1)

6-3.49 Compare and contrast the pathophysiology of GI hemorrhage and bowel obstruction in the elderly with that of a young adult. (C-3)

6-3.50 Discuss the normal and abnormal changes with age related to toxicology. (C-1)
6-3.51 Discuss the assessment of the elderly patient with complaints related to toxicology. (C-1)
6-3.52 Identify the need for intervention and transportation of the patient with toxicological problems. (C-1)
6-3.53 Develop and execute a treatment and management plan of the elderly patient with toxicological problems. (C-3)
6-3.54 Describe the epidemiology in the elderly, including the incidence, morbidity/ mortality, risk factors, and prevention strategies, for patients with drug toxicity. (C-1)
6-3.55 Compare and contrast the pathophysiology of drug toxicity in the elderly with that of a younger adult. (C-3)
6-3.56 Discuss the assessment findings common in elderly patients with drug toxicity. (C-1)
6-3.57 Discuss the management/ considerations when treating an elderly patient with drug toxicity. (C-1)
6-3.58 Describe the epidemiology for drug and alcohol abuse in the elderly, including incidence, morbidity/ mortality, risk factors, and prevention strategies. (C-1)
6-3.59 Compare and contrast the pathophysiology of drug and alcohol abuse in the elderly with that of a younger adult. (C-3)
6-3.60 Discuss the assessment findings common in elderly patients with drug and alcohol abuse. (C-1)
6-3.61 Discuss the management/ considerations when treating an elderly patient with drug and alcohol abuse. (C-1)
6-3.62 Discuss the normal and abnormal changes of thermoregulation with age. (C-1)
6-3.63 Discuss the assessment of the elderly patient with complaints related to thermoregulation. (C-1)
6-3.64 Identify the need for intervention and transportation of the patient with environmental considerations. (C-1)
6-3.65 Develop and execute a treatment and management plan of the elderly patient with environmental considerations. (C-3)
6-3.66 Compare and contrast the pathophysiology of hypothermia and hyperthermia in the elderly with that of a younger adult. (C-3)
6-3.67 Discuss the assessment findings and management plan for elderly patients with hypothermia and hyperthermia. (C-1)
6-3.68 Discuss the normal and abnormal psychiatric changes of age. (C-1)
6-3.69 Describe the epidemiology of depression and suicide in the elderly, including incidence, morbidity/ mortality, risk factors, and prevention strategies. (C-1)
6-3.70 Compare and contrast the psychiatry of depression and suicide in the elderly with that of a younger adult. (C-3)
6-3.71 Discuss the assessment of the elderly patient with psychiatric complaints, including depression and suicide. (C-1)
6-3.72 Identify the need for intervention and transport of the elderly psychiatric patient. (C-1)
6-3.73 Develop a treatment and management plan of the elderly psychiatric patient, including depression and suicide. (C-3)
6-3.74 Discuss the normal and abnormal changes of the integumentary system with age. (C-1)
6-3.75 Describe the epidemiology for pressure ulcers in the elderly, including incidence, morbidity/ mortality, risk factors, and prevention strategies. (C-1)
6-3.76 Compare and contrast the pathophysiology of pressure ulcers in the elderly with that of a younger adult. (C-3)
6-3.77 Discuss the assessment of the elderly patient with complaints related to the integumentary system, including pressure ulcers. (C-1)
6-3.78 Identify the need for intervention and transportation of the patient with complaints related to the integumentary system. (C-1)
6-3.79 Develop a treatment and management plan of the elderly patient with complaints related to the integumentary system, including pressure ulcers. (C-3)

6-3.80 Discuss the normal and abnormal changes of the musculoskeletal system with age. (C-1)
6-3.81 Describe the epidemiology for osteoarthritis and osteoporosis, including incidence, morbidity/ mortality, risk factors, and prevention strategies. (C-1)
6-3.82 Compare and contrast the pathophysiology of osteoarthritis and osteoporosis with that of a younger adult. (C-3)
6-3.83 Discuss the assessment of the elderly patient with complaints related to the musculoskeletal system, including osteoarthritis and osteoporosis. (C-1)
6-3.84 Identify the need for intervention and transportation of the patient with musculoskeletal complaints. (C-1)
6-3.85 Develop a treatment and management plan of the elderly patient with musculoskeletal complaints, including osteoarthritis and osteoporosis. (C-3)
6-3.86 Describe the epidemiology for trauma in the elderly, including incidence, morbidity/ mortality, risk factors, and prevention strategies for patients with orthopedic injuries, burns and head injuries. (C-1)
6-3.87 Compare and contrast the pathophysiology of trauma in the elderly with that of a younger adult, including orthopedic injuries, burns and head injuries. (C-3)
6-3.88 Discuss the assessment findings common in elderly patients with traumatic injuries, including orthopedic injuries, burns and head injuries. (C-1)
6-3.89 Discuss the management/ considerations when treating an elderly patient with traumatic injuries, including orthopedic injuries, burns and head injuries. (C-1)
6-3.90 Identify the need for intervention and transport of the elderly patient with trauma. (C-1)

AFFECTIVE OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

6-3.91 Demonstrate and advocate appropriate interactions with the elderly that conveys respect for their position in life. (A-3)
6-3.92 Recognize the emotional need for independence in the elderly while simultaneously attending to their apparent acute dependence. (A-1)
6-3.93 Recognize and appreciate the many impediments to physical and emotional well being in the elderly. (A-2)
6-3.94 Recognize and appreciate the physical and emotional difficulties associated with being a caretaker of an impaired elderly person, particularly the patient with Alzheimer's disease. (A-3)

PSYCHOMOTOR OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

6-3.95 Demonstrate the ability to assess a geriatric patient. (P-2)
6-3.96 Demonstrate the ability to adjust their assessment to a geriatric patient. (P-3)

DECLARATIVE

- **I. Introduction**
  - **A. Special population with special and varying needs**
  - **B. Epidemiology/ demographics**
    - **1. Prevalence/ "graying of America"**
  - **C. Societal issues**
    - **1. Society's view of aging**
    - **2. Social issues**
      - **a. Isolation**
      - **b. Marital status**
    - **3. Living environments**
      - **a. Independent living**
        - **(1) Spousal/ family support**
        - **(2) Visiting nursing**
      - **b. Dependent living**
        - **(1) Live in nursing care**
        - **(2) Assisted living environments**
        - **(3) Nursing homes**
    - **4. Financial aspects**
    - **5. Ethics**
      - **a. Advanced directives**
  - **D. Referral resources**
    - **1. Private**
      - **a. National**
      - **b. State**
      - **c. Local**
    - **2. Governmental**
      - **a. National**
      - **b. State**
      - **c. Local**

- **II. Pathophysiology, assessment and management**
  - **A. Pathophysiology**
    - **1. Multi-system failure**
      - **a. Concomitant disease process**
      - **b. Non specific complaints**
      - **c. Decreased ability to detect changes**
    - **2. Pharmacology in the elderly**
      - **a. Age related pharmacokinetics**
        - **(1) Older adults are more sensitive to drugs**
        - **(2) Experience prolonged drug effects**
        - **(3) Have more adverse reactions**
      - **b. Polypharmacy**
        - **(1) Many chronic illnesses**
        - **(2) Interactions with over the counter medication**
      - **c. Compliance**
        - **(1) Multiple dosage regimens**
        - **(2) Difficult reading/ hearing/ understanding directions**

3. **Problems with mobility and falls**
   - a. **Physical effects of decreased mobility**
     - (1) **Poor nutrition**
     - (2) **Difficulty with elimination**
     - (3) **Circulation**
     - (4) **Skin integrity**
     - (5) **Predisposes patients to falls and injury**
   - b. **Psychological effect of decreased mobility**
     - (1) **Loss of independence**
     - (2) **Loss of confidence**
     - (3) **Feeling "old"**
   - c. **Risk factors for falls**
     - (1) **History of falls**
     - (2) **Dizziness, weakness, impaired vision**
     - (3) **Altered gait**
     - (4) **CNS problems/ decreased mental status**
     - (5) **Medications**
   - d. **Prevention strategies**
     - (1) **Use of assistive devices**
     - (2) **Environmental modifications**
       - (a) **Remove scatter rugs and secure loose carpeting**
       - (b) **Remove items that may cause tripping**
       - (c) **Provide/ use railings**
       - (d) **Adequate lighting**
       - (e) **Unclutter the environment**
       - (f) **Arrange furniture for walking ease**
       - (g) **Use non slip decals in the tub**
       - (h) **Provide handrails on tubs, showers, and commodes**
4. **Problems with sensations**
   - a. **Problems with seeing**
     - (1) **Pathophysiology**
       - (a) **Visual changes begin at age 40 and increase gradually**
       - (b) **Effects**
         - i) **Reading**
         - ii) **Depth perception**
         - iii) **Loss of independence**
         - iv) **Limitations**
         - v) **Poor accommodation**
         - vi) **Altered color perception**
         - vii) **Sensitivity to light and glare**
         - viii) **Decreased visual acuity**
     - (2) **Cataracts**
       - (a) **Lens becomes hardened and opaque**
       - (b) **Patient may have**
         - i) **Blurred vision**
         - ii) **Double vision**
         - iii) **Spots**
         - iv) **Ghost images**
       - (c) **May require surgery if it affects lifestyles**

(3) Glaucoma
(a) Increased intraoccular pressure
(b) Damage to optic nerve
(c) May progress to permanent loss of peripheral and central vision
(d) Oral medications and eye drops may relieve the pressure

b. Problems with hearing
(1) Not all elderly patient have hearing loss
(2) Overall hearing decreases
(3) Ability to perceive speech
(4) Tinnitus
(5) Meniere's disease
(6) Hearing loss
(a) Impairs the ability to communicate
(b) Hearing aids may not restore hearing to normal

c. Problems with speech
(1) Word retrieval
(2) Decreased fluency of speech
(3) Slowed rate of speech
(4) Change in voice quality

d. Pain perception

e. Assessment findings specific to the elderly patient

f. Management implications for the elderly patient
(1) Alterations for sensory deficits

5. Problems with continence and elimination

a. Incontinence
(1) Definition
(2) Incontinence is never normal
(3) Urinary or bowel
(4) Mild to total incontinence
(5) Extremely embarrassing
(6) Can lead to
(a) Skin irritation
(b) Skin breakdown
(c) Urinary tract infection
(7) Pathophysiology
(a) Continence requires
i) Anatomically correct GI/ GU tract
ii) Competent sphincter mechanism
iii) Cognitive and physical function
iv) Motivation
(b) Effects of age
i Decrease in bladder capacity
ii Involuntary bladder contractions
iii Decreased ability to postpone voiding
iv Medications may effect bladder/ bowel control
(8) Management implications
(a) Some cases of incontinence are managed surgically
(b) Absorptive devices are commonly used for fecal and urinary incontinence

- (c) Indwelling catheters are less common and often cause infection
- (d) Self esteem and social issues appreciation

b0 Elimination
- (1) Causes of difficultly in urination
  - (a) Enlargement of the prostate in men
  - (b) Urinary tract infections
  - (c) Acute or chronic renal failure
- (2) Causes of difficulty in bowel elimination
  - (a) Diverticular disease
  - (b) Constipation
  - (c) Colorectal cancer

B0 Assessment of the elderly patient

1 Patience is of utmost importance

2 General health assessment
- a0 Social history
- b0 Living situation
- c0 Social support system
- d0 Activity level
- e0 Medication history
  - (1) Prescription medications
  - (2) Non-prescription medications
- f0 Nutrition
  - (1) Overall health is greatly affected by nutrition
  - (2) Malnutrition causes dehydration and hypoglycemia
  - (3) Lowered sensory stimulation of eating
  - (4) Decreased internal cues of hunger and thirst
  - (5) Caloric requirements deceases with age
  - (6) Eating may be complicated by
    - (a) Breathing
    - (b) Abdominal pain
    - (c) Nausea/ vomiting
    - (d) Poor dental care
    - (e) Health problems
    - (f) Medications
    - (g) Alcohol/ drugs
- g0 Sleep and rest
- h0 Environmental assessment
  - (1) Ability for self care

3 Geriatric assessment
- a0 Factors complicating assessment
  - (1) Multiple diseases/ complaints
  - (2) Absent classical symptoms
  - (3) Failure to relate symptoms
  - (4) Sensory alterations
  - (5) Polypharmacy
  - (6) Other
- b0 Assessment communication methods
  - (1) Always introduce yourself
  - (2) Speak slowly, distinctly, and respectfully

- (3) Speak to the patient first rather than family or bystanders
- (4) Speak face to face, at eye level with eye contact
- (5) Locate hearing aid or eyeglasses if needed
- (6) Turn on lights
- (7) Verbal and nonverbal communication of concern and empathy
- (8) Use polite, respectful terms
- (9) Preserve dignity
- (10) Always explain before you do

c0 History
- (1) Common medical complaints
- (2) Environment assessment

d0 Physical exam
- (1) Mental status assessment

C0 Management considerations for the elderly
- 1 Airway and ventilation
- 2 Circulation
- 3 Pharmacological
- 4 Non-pharmacological
- 5 Transport considerations
  - a0 Gentle handling
  - b0 Extra padding
- 6 Psychological support/ communication strategies
  - a0 Communication strategies
    - (1) Encourage the patient to express their feelings
    - (2) Acknowledge nonverbal massages
    - (3) Avoid questions which are judgmental
    - (4) Confirm what the patient says
    - (5) Take responsibility for communication breakdowns
  - b0 Incontinence
    - (1) Do not make a big deal about incontinence
    - (2) Maintain patient dignity
    - (3) Reassurance that it is a treatable problem
    - (4) Usually does NOT require surgical intervention

III System pathophysiology, assessment and management

A0 Pulmonary changes in the elderly
- 1 Normal and abnormal changes with age
  - a0 Kyphosis may affect pulmonary function
  - b0 Decreased lung function due to
    - (1) Chronic exposure to pollutants
    - (2) Decreased respiratory muscle tone
    - (3) Changes in alveolar/ capillary exchange
    - (4) Respiratory center changes
- 2 Assessment findings specific to the elderly
  - a0 Most common pulmonary diseases in the elderly
    - (1) Pneumonia
    - (2) Pulmonary embolism
    - (3) Obstructive airway diseases
- 3 Management implications for the elderly
  - a0 Airway and ventilation

- b0 Circulation
- c0 Pharmacological/ non-pharmacological
- d0 Transport considerations
- e0 Psychological support/ communications strategies

4 Specific illnesses

- a0 Pneumonia in the elderly
  - (1) Epidemiology in the elderly
    - (a) Incidence in the elderly
      - i Usually bacterial
      - ii Aspiration pneumonia due to difficult swallowing
      - iii Viral
      - iv High incidence due to
        - a65535 Decreased immune response
        - b65535 Reduced pulmonary function
        - c65535 Increased gram-negative pharyngeal colonization
    - (b) Morbidity/ mortality in the elderly
      - i Leading cause of death in the elderly
      - ii Often fatal in frail adults
      - iii Concomitant chronic diseases
    - (c) Risk factors
      - i Institutional environments
      - ii Chronic diseases
      - iii Immune compromise
    - (d) Prevention strategies
      - i Prophylaxis treatment with antibiotics
  - (2) Assessment findings specific for the elderly patient
    - (a) Fever
    - (b) Cough
    - (c) Shortness of breath
    - (d) Often presents with mental status alterations
    - (e) May be afebrile
    - (f) Tachypnea
  - (3) Management considerations for the elderly patient
    - (a) Manage life-threats
    - (b) Maintain oxygenation
    - (c) Must be transported for diagnosis
    - (d) High rate of hospital admission
- b0 Chronic obstructive pulmonary disease in the elderly
  - (1) Epidemiology in the elderly
    - (a) Incidence in the elderly
      - i Combined bronchitis and emphysema in patients with a long history of smoking
    - (b) Morbidity/ mortality in the elderly
      - i Diminished efficiency of breathing reduced tolerance
    - (c) Risk factors
      - i Cigarette smoking
    - (d) Prevention strategies
  - (2) Assessment findings specific for the elderly patient
    - (a) Obtain history of prior intubation or steroid therapy

- (b) Wheezing and prolonged expiratory phase
- (c) Breath sounds are unreliable

(3) Management considerations for the elderly patient

c0 Pulmonary embolism in the elderly

(1) Epidemiology in the elderly

- (a) Incidence in the elderly
- (b) Morbidity/ mortality in the elderly
  - i Therapy is effective
  - ii Mortality is high due to difficulty in diagnosis
- (c) Risk factors
  - i Deep vine thrombosis
  - ii Venous stasis from immobility
  - iii Tumor
  - iv Surgery
- (d) Prevention strategies

(2) Assessment findings specific for the elderly patient

- (a) Dyspnea
- (b) Pleuritic chest pain
- (c) Cough
- (d) Tachypnea

(3) Management considerations for the elderly patient

- (a) Airway and ventilation
  - i Lysing the thrombus
  - ii Anticoagulation after confirming no GI bleeding
- (b) Circulation
- (c) Pharmacological/ non-pharmacological
- (d) Transport consideration
- (e) Psychological support/ communication strategies

B0 Cardiology in the elderly

1 Normal and abnormal changes with age

- a0 Arteries become increasingly rigid
- b0 Decreased peripheral resistance
- c0 Reduced blood flow to all organs
- d0 Increased blood pressure
- e0 Widened pulse pressure
- f0 Heart muscle stiffens
- g0 Increased incidence of postural hypotension
- h0 Increased atherosclerosis throughout the body

2 Assessment findings specific to the elderly

a0 History

- (1) Cardiovascular fitness
- (2) Changes in exercise tolerance
- (3) Recent diet history
- (4) Medications
- (5) Smoking
- (6) Breathing difficulty, especially at night
- (7) Palpitations, flutter, skipped beats

b0 Physical exam

- (1) The heart increases in size
- (2) Hypertension and orthostatic hypotension

- (3) Dependent edema
- (4) Consider checking the blood pressure in both arms
- (5) Check pulses in all extremities routinely
- (6) Check for carotid bruits
- (7) Check for dehydration

3 Management implications for the elderly
- a0 Airway and ventilation
- b0 Circulation
- c0 Pharmacological/ non-pharmacological
  - (1) Use caution to avoid medication interaction
  - (2) Proper dosing is very important due to
    - (a) Less lean body mass
    - (b) Low fluid reserve
    - (c) Slow metabolism
    - (d) Decreased renal and hepatic function
- d0 Transport consideration
- e0 Psychological support/ communication strategies

4 Specific illnesses
- a0 Myocardial infarction in the elderly
  - (1) Epidemiology in the elderly
    - (a) Incidence in the elderly
    - (b) Morbidity/ mortality in the elderly
      - i Mortality doubles after 70 years old
      - ii Much greater complication rate
    - (c) Risk factors
      - i Physical exertion
    - (d) Prevention strategies
  - (2) Assessment findings specific for the elderly patient
    - (a) Chest pain is less common in the elderly
    - (b) Much greater incidence of silent MI
    - (c) Dyspnea is the most common sign in patients over 85
    - (d) Any nonspecific complaints of upper trunk discomfort
  - (3) Management considerations for the elderly patient
- b0 Heart failure in the elderly
  - (1) Epidemiology in the elderly
    - (a) Incidence in the elderly
      - i More frequent in older adults
      - ii Large incidence of non cardiac causes
    - (b) Morbidity/ mortality in the elderly
    - (c) Risk factors
    - (d) Prevention strategies
  - (2) Assessment findings specific for the elderly patient
    - (a) First symptom of left failure is often fatigue
    - (b) Two pillow orthopnea
    - (c) Dyspnea on exertion
    - (d) Dry, hacking cough progressing to productive cough
    - (e) Dependent edema due to right failure
    - (f) Nocturia
    - (g) Anorexia, hepatomegaly, ascites
  - (3) Management considerations for the elderly patient

- **c0 Dysrhythmias in the elderly**
  - **(1) Epidemiology in the elderly**
    - **(a) Incidence in the elderly**
      - **i The most common cause is hypertensive heart disease**
      - **ii PVCs are present in most adults over 80**
      - **iii Can be caused by anything that decreases myocardial blood flow**
      - **iv May be caused by electrolyte aberrancies**
      - **v Atrial fibrillation is the most common dysrhythmia**
    - **(b) Morbidity/ mortality in the elderly**
      - **i Serious due to the decreased tolerance due to less CO**
      - **ii Can lead to falls from cerebral hypoperfusion**
      - **iii Can lead to TIAs and CHF**
    - **(c) Risk factors**
    - **(d) Prevention strategies**
  - **(2) Assessment findings specific for the elderly patient**
  - **(3) Management considerations for the elderly patient**
- **d0 Aneurysm in the elderly**
  - **(1) Epidemiology in the elderly**
    - **(a) Incidence in the elderly**
    - **(b) Morbidity/ mortality in the elderly**
    - **(c) Risk factors**
    - **(d) Prevention strategies**
  - **(2) Assessment findings specific for the elderly patient**
  - **(3) Management considerations for the elderly patient**
- **e0 Hypertension in the elderly**
  - **(1) Epidemiology in the elderly**
    - **(a) Incidence in the elderly**
      - **i Increases with atherosclerosis**
    - **(b) Morbidity/ mortality in the elderly**
      - **i BP greater than 160/95 doubles mortality in men**
      - **ii Can lead to kidney loss**
      - **iii Can lead to blindness**
    - **(c) Risk factors**
      - **i Age**
      - **ii Diabetes**
      - **iii Obesity**
    - **(d) Prevention strategies**
      - **i Medication compliance**
      - **ii Dietary sodium reduction**
      - **iii Exercise**
      - **iv Smoking cessation**
  - **(2) Assessment findings specific for the elderly patient**
    - **(a) Often presents as memory loss**
      - **i Epistaxis**
      - **ii Slow tremors**
      - **iii Nausea and vomiting**
  - **(3) Management considerations for the elderly patient**

- **C0 Neurology in the elderly**
  - **1 Normal and abnormal changes with age**
    - **a0 Cognition requires perceptual organs and the brain**
    - **b0 Cognitive function is not affected by the normal aging process**
    - **c0 Slight changes in the following are normal**
      - **(1) Difficulty with recent memory**
      - **(2) Psychomotor slowing**
      - **(3) Forgetfulness**
      - **(4) Decrease in reaction time**
  - **2 Assessment findings specific to the elderly**
    - **a0 Best if conducted over time**
    - **b0 Ask family or caretakers for information to determine the progression**
    - **c0 Focus on the patient's**
      - **(1) Perceptions**
      - **(2) Thinking processes**
      - **(3) Communication**
    - **d0 Provide an environment with minimal distractions**
    - **e0 Mental status/ cognitive functioning exam**
      - **(1) Be calm, unhurried**
      - **(2) Ask clear, direct questions**
      - **(3) Give the patient time to respond**
      - **(4) Establish normal patterns of behavior and changes in behavior**
      - **(5) Include ability to perform activities of daily living**
      - **(6) Look for patters of behavior over time**
      - **(7) Assess the patient's mood and affective or emotional state**
    - **f0 Assess for**
      - **(1) Weakness**
      - **(2) Chronic fatigue**
      - **(3) Changes in sleep patterns**
      - **(4) Syncope, or near syncope**
  - **3 Management implications for the elderly**
    - **a0 Airway and ventilation**
    - **b0 Circulation**
    - **c0 Pharmacological/ non-pharmacological**
    - **d0 Transport consideration**
    - **e0 Psychological support/ communication strategies**
      - **(1) Care for the patient with respect and dignity**
  - **4 Specific illnesses**
    - **a0 Cerebral vascular disease**
      - **(1) Epidemiology in the elderly**
        - **(a) Incidence**
        - **(b) Morbidity/ mortality**
          - **i Expected course of disease**
          - **ii Complications**
        - **(c Risk factors**
        - **(d Prevention strategies**
      - **(2 Pathophysiology**
        - **(a Cerebral vascular accident**
        - **(b Transient ischemic attack**
      - **(3 Assessment**

(4 Management

b. Delirium

(1 Epidemiology in the elderly
- (a Incidence
- (b Morbidity/ mortality
  - i) Expected course of disease
    - a) Potentially reversible, if caught early
    - b) Can progress into chronic mental disfunction
  - ii) Complications
- (c Risk factors
- (d Prevention strategies

(2 Pathophysiology
- (a Organic brain dysfunction
- (b Possible causes
  - i) Tumor
  - ii) Metabolic disorders
  - iii) Fever
  - iv) Drug reaction
  - v) Alcohol intoxication/ withdrawal

(3 Assessment findings specific for the elderly patient
- (a Acute onset of anxiety
- (b Unable to focus
- (c Unable to think logically or maintain attention
- (d Memory is intact

(4 Management considerations for the elderly patient

c. Dementia

(1 Epidemiology
- (a Incidence
  - i) Increases with age
  - ii) Half of nursing home patients have some form of dementia
- (b Morbidity/ mortality
  - i) Generally considered irreversible
  - ii) Expected course of disease
  - iii) Complications
    - a) Patient becomes dependent on others
- (c Risk factors
- (d Prevention strategies

(2 Pathophysiology in the elderly
- (a Many causes
  - i) Strokes
  - ii) Genetic or viral factors
  - iii) Alzheimer's
- (b Progressive loss of cognitive function

(3 Assessment
- (a Progressive disorientation
- (b Shortened attention span
- (c Aphasia, nonsense talking
- (d Hallucinations
- (e Caretaker exhaustion

- (4 Management implications
  - (a Severely limits ability to communicate
- d. Alzheimer's disease
  - (1 Epidemiology
    - (a Incidence
    - (b Morbidity/ mortality
      - i) Expected course of disease
      - ii) Complications
    - (c Risk factors
    - (d Prevention strategies
  - (2 Pathophysiology
  - (3 Assessment
  - (4 Management implications
- e. Parkinson's disease
  - (1 Epidemiology
    - (a Incidence
    - (b Morbidity/ mortality
      - i) Expected course of disease
      - ii) Complications
    - (c Risk factors
    - (d Prevention strategies
  - (2 Pathophysiology
  - (3 Assessment
  - (4 Management implications

D. Endocrinology in the elderly

1. Normal and abnormal changes with age
2. Assessment findings specific to the elderly
3. Management implications for the elderly
   - a. Airway and ventilation
   - b. Circulation
   - c. Pharmacological/ non-pharmacological
   - d. Transport considerations
   - e. Psychological support/ communications strategies
4. Specific illnesses
   - a. Diabetes in the elderly
     - (1 Epidemiology in the elderly
       - (a Incidence in the elderly
         - i) Approximately 20% of older adults have diabetes
         - ii) Almost 40% have some impaired glucose tolerance
         - iii) Most commonly type II
       - (b Morbidity/ mortality in the elderly
       - (c Risk factors
       - (d Prevention strategies
     - (2 Assessment findings specific for the elderly patient
       - (a Test for neuropathy
       - (b Test visual acuity
     - (3 Management considerations for the elderly patient
   - b. Thyroid diseases in the elderly
     - (1 Epidemiology in the elderly
       - (a Incidence in the elderly

- (b Morbidity/ mortality in the elderly
- (c Risk factors
- (d Prevention strategies
- (2 Assessment findings specific for the elderly patient
- (3 Management considerations for the elderly patient

E. Gastroenterology in the elderly

1. Epidemiology
2. Assessment findings
   - a. Look for indication of malnutrition
   - b. Hiatal hernia
3. Management implications
   - a. Airway and ventilation
   - b. Circulation
   - c. Pharmacological/ non-pharmacological
   - d. Transport consideration
   - e. Psychological support/ communication strategies
4. Specific illnesses
   - a. GI hemorrhage in the elderly
     - (1 Increased risk in the elderly
   - b. Bowel obstruction in the elderly

F. Toxicology in the elderly

1. Pathophysiology/ pharmacokinetics
   - a. Decreased kidney function alters elimination
   - b. Increased likelihood of CNS side effects
   - c. Altered GI absorption
   - d. Decreased liver blood flow alters metabolism and excretion
2. Specific
   - a. Lidocaine toxicity in the elderly
     - (1 Epidemiology in the elderly
     - (2 Assessment findings in the elderly
     - (3 Management implications for the elderly
   - b. Beta-blockers in the elderly
     - (1 Epidemiology in the elderly
     - (2 Assessment findings in the elderly
     - (3 Management implications for the elderly
   - c. Antihypertensives in the elderly
     - (1 Epidemiology in the elderly
     - (2 Assessment findings in the elderly
     - (3 Management implications for the elderly
   - d. Diuretics in the elderly
     - (1 Epidemiology in the elderly
     - (2 Assessment findings in the elderly
     - (3 Management implications for the elderly
   - e. Digitalis in the elderly
     - (1 Epidemiology in the elderly
     - (2 Assessment findings in the elderly
     - (3 Management implications for the elderly
   - f. Psychotropics in the elderly
     - (1 Epidemiology in the elderly
     - (2 Assessment findings in the elderly

- (3 Management implications for the elderly
- g. Antidepressants in the elderly
  - (1 Epidemiology in the elderly
  - (2 Assessment findings in the elderly
  - (3 Management implications for the elderly
- h. Substance abuse in the elderly
  - (1 Epidemiology in the elderly
  - (2 Assessment findings in the elderly
  - (3 Management implications for the elderly
- i. Alcohol abuse in the elderly
  - (1 Epidemiology
    - (a Common problem
    - (b History of alcoholism
    - (c Severe stress is a risk factor
  - (2 Assessment findings
    - (a Often very subtle signs
    - (b Small amounts of alcohol can cause intoxications
    - (c Mood swings, denial, and hostility
    - (d Question family and friends
    - (e Confusion
    - (f History of falls
    - (g Anorexia
    - (h Insomnia
  - (3 Management implications
    - (a Requires identification and referral
- j. Drug abuse in the elderly
  - (1 Epidemiology
    - (a Very common problem in the elderly
    - (b Risk factors
      - i) Vision and memory changes
      - ii) Polypharmacy
      - iii) Nutritional deficits
  - (2 Assessment findings
    - (a Memory changes
    - (b Drowsy
    - (c Decreased vision/ hearing
    - (d Orthostatic hypotension
    - (e Poor dexterity
  - (3 Management implications
    - (a Requires identification and referral

G. Environmental considerations in the elderly
1. Normal and abnormal changes with age
2. Assessment findings specific to the elderly
3. Management implications for the elderly
   - a. Airway and ventilation
   - b. Circulation
   - c. Pharmacological/ non-pharmacological
   - d. Transport considerations
   - e. Psychological support/ communications strategies
4. Specific illnesses

- a. Hypothermia in the elderly
- b. Hyperthermia in the elderly

H. Behavioral/ psychiatric disorders in the elderly
- 1. Normal and abnormal changes with age
- 2. Assessment findings specific to the elderly
- 3. Management implications for the elderly
  - a. Airway and ventilation
  - b. Circulation
  - c. Pharmacological/ non-pharmacological
  - d. Transport considerations
  - e. Psychological support/ communications strategies
- 4. Specific situations
  - a. Depression in the elderly
    - (1 Epidemiology in the elderly
      - (a Incidence in the elderly
      - (b Morbidity/ mortality in the elderly
      - (c Risk factors
      - (d Prevention strategies
    - (2 Assessment findings specific for the elderly patient
    - (3 Management considerations for the elderly patient
  - b. Suicide in the elderly
    - (1 Epidemiology in the elderly
      - (a Incidence in the elderly
      - (b Morbidity/ mortality in the elderly
      - (c Risk factors
      - (d Prevention strategies
    - (2 Assessment findings specific for the elderly patient
    - (3 Management considerations for the elderly patient

I. Integumentary changes with age
- 1. Normal and abnormal changes with age
  - a. Epidermal cellular turnover decreases
  - b. Slower healing
  - c. Increased risk of secondary infection
  - d. Increased risk of skin tumors, fungal or viral infections
  - e. Skin decreases in thickness, increasing susceptibility to tears
  - f. Hair becomes finer and thinner
- 2. Assessment findings specific to the elderly
- 3. Management implications for the elderly
  - a. Airway and ventilation
  - b. Circulation
  - c. Pharmacological/ non-pharmacological
  - d. Transport considerations
  - e. Psychological support/ communications strategies
- 4. Specific illnesses
  - a. Pressure ulcers in the elderly
    - (1 Result from tissue hypoxia
    - (2 Usually over bony areas
    - (3 Common in immobile patients
    - (4 Possibility increases with
      - (a Altered sensory perception

- (b Skin exposure to moisture
- (c Decreased activity
- (d Decreased mobility
- (e Poor nutrition
- (f Friction or shear

J. Musculoskeletal changes with age

1. Normal and abnormal changes with age
2. Assessment findings specific to the elderly
   a. Bone fractures with mild trauma
3. Management implications for the elderly
   a. Airway and ventilation
   b. Circulation
   c. Pharmacological/ non-pharmacological
   d. Transport considerations
   e. Psychological support/ communications strategies
4. Specific illnesses
   a. Osteoarthritis in the elderly
      (1 Epidemiology in the elderly
         (a Incidence in the elderly
         (b Morbidity/ mortality in the elderly
         (c Risk factors
         (d Prevention strategies
      (2 Assessment findings specific for the elderly patient
      (3 Management considerations for the elderly patient
   b. Osteoporosis in the elderly
      (1 Epidemiology in the elderly
         (a Incidence in the elderly
         (b Morbidity/ mortality in the elderly
         (c Risk factors
         (d Prevention strategies
      (2 Assessment findings specific for the elderly patient
      (3 Management considerations for the elderly patient

K. Trauma in the elderly

1. Pathophysiology
   a. Osteoporosis and muscle weakness increases likelihood of fractures
   b. Reduced cardiac reserve decreases the ability to compensate for blood loss
   c. Decreased respiratory function increases likelihood of adult respiratory distress syndrome (ARDS)
   d. Impaired renal function decreases the ability to adapt to fluid shifts
2. Epidemiology
   a. Fifth leading cause of death
   b. Mortality rates markedly increased
   c. Post injury disability more common
3. Assessment findings
   a. Mechanism of injury
      (1 Falls
      (2 Motor vehicle crashes
      (3 Burns
      (4 Assault/ abuse
      (5 Other - syncope, MI, etc. may be underlying cause of trauma

- **b. Initial level of consciousness very important**
- **c. Blood pressure that is normal, may be hypovolemic**
- **d. Fractures can be occult due to diminished pain perception**
- **e. Observe scene for clues of abuse**
  - **(1 Physical abuse**
  - **(2 Active and passive neglect**
  - **(3 Psychological abuse**
  - **(4 Financial abuse**
  - **(5 Self abuse**
  - **(6 Reporting**

4. Management

- **a. Airway and ventilation**
  - **(1 Dentures may need to be removed**
  - **(2 Oxygen is very important due to vascular disease**
- **b. Circulation**
  - **(1 Fluid administration should be closely monitored for signs/ symptoms of pulmonary edema**
- **c. Other**
  - **(1 Prevent hypothermia by keeping patient warm**
  - **(2 ECG monitoring is indicated due to increased cardiac disease**
- **d. Transportation consideration**
  - **(1 Appropriate mode**
  - **(2 Appropriate facilities**
- **e. Psychological support/ communications strategies**

5. Specific injuries

- **a. Orthopedic injuries**
  - **(1 Hip fracture is the most common acute orthopedic condition**
  - **(2 Elderly are susceptible to stress fractures of femur, pelvis, tibia**
  - **(3 Packaging should include bulk, and padding to fill in areas**
  - **(4 Kyphosis may require extra padding under the shoulders to maintain alignment**
- **b. Burns**
  - **(1 Increased risk of significant mortality and morbidity due to pre-existing disease**
  - **(2 Skin changes result in increased burn depth**
  - **(3 Altered nutrition decreases defense against infection**
  - **(4 Fluid important to prevent renal tubular damage**
  - **(5 Assess hydration in initial hours after burn injury by BP, pulse, and urine output (at least 50-60 cc/ hr)**
- **c. Head injury**
  - **(1 More serious in the elderly**
  - **(2 Brain shrinkage allows brain to move**
  - **(3 Subdural hematoma may develop more slowly, sometimes over days or weeks**

UNIT TERMINAL OBJECTIVE

6-4 At the completion of this unit, the paramedic student will be able to integrate the assessment findings to formulate a field impression and implement a treatment plan for the patient who has sustained abuse or assault.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

6-4.1 Discuss the incidence of abuse and assault. (C-1)
6-4.2 Describe the categories of abuse. (C-1)
6-4.3 Discuss examples of spouse abuse. (C-1)
6-4.4 Discuss examples of elder abuse. (C-1)
6-4.5 Discuss examples of child abuse. (C-1)
6-4.6 Discuss examples of sexual assault. (C-1)
6-4.7 Describe the characteristics associated with the profile of the typical abuser of a spouse. (C-1)
6-4.8 Describe the characteristics associated with the profile of the typical abuser of the elder. (C-1)
6-4.9 Describe the characteristics associated with the profile of the typical abuser of children. (C-1)
6-4.10 Describe the characteristics associated with the profile of the typical assailant of sexual assault. (C-1)
6-4.11 Identify the profile of the "at-risk" spouse. (C-1)
6-4.12 Identify the profile of the "at-risk" elder. (C-1)
6-4.13 Identify the profile of the "at-risk" child. (C-1)
6-4.14 Discuss the assessment and management of the abused patient. (C-1)
6-4.15 Discuss the legal aspects associated with abuse situations. (C-1)
6-4.16 Identify community resources that are able to assist victims of abuse and assault. (C-1)
6-4.17 Discuss the documentation associated with abused and assaulted patient. (C-1)

AFFECTIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

6-4.18 Demonstrate sensitivity to the abused patient. (A-1)
6-4.19 Value the behavior of the abused patient. (A-2)
6-4.20 Attend to the emotional state of the abused patient. (A-1)
6-4.21 Recognize the value of non-verbal communication with the abused patient. (A-1)
6-4.22 Attend to the needs for reassurance, empathy and compassion with the abused patient. (A-1)
6-4.23 Listen to the concerns expressed by the abused patient. (A-1)
6-4.24 Listen and value the concerns expressed by the sexually assaulted patient. (A-2)

PSYCHOMOTOR OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

6-4.25 Demonstrate the ability to assess a spouse, elder or child abused patient. (P-1)
6-4.26 Demonstrate the ability to assess a sexually assaulted patient. (P-1)

DECLARATIVE

- **I. Introduction**
  - **A. Epidemiology**
    - **1. Incidence**
      - **a. Abuse of spouse, elderly relatives, and children is greater than most estimate**
      - **b. Only 10% of women report battering incidents**
      - **c. Over 1 million children suffer from abuse or neglect**
    - **2. Mortality/ morbidity**
      - **a. Victims may die as a result of the abuse or assault**
      - **b. Victims may suffer mental or physical injuries**
    - **3. Risk factors**
      - **a. Men and women who beat one another also most likely beat their children**
      - **b. Children of abusive and unloving homes are more likely to become spouse or child batterers and later, abusers of their elderly parents**
    - **4. Prevention strategies**
      - **a. Early detection**
      - **b. Social services support**
      - **c. Altering life styles**

- **II. The battered spouse**
  - **A. Epidemiology**
    - **1. Incidence**
      - **a. Not a new phenomenon**
      - **b. The act itself can be traced to early history**
  - **B. Battered women**
    - **1. Overview**
      - **a. Women generally report incident only as a last resort**
      - **b. Reasons for not reporting**
        - **(1) Fear**
          - **(a) For her self**
          - **(b) For her children**
        - **(2) Believes behavior will change**
        - **(3) Lack of financial support**
          - **(a) No money**
          - **(b) No one to turn to**
          - **(c) No knowledge of where to go**
        - **(4) Believes she is the cause of the violent behavior**
        - **(5) Believes that it is part of the marriage and must endure in order to keep the family together**
      - **c. Characteristics of wife-battering**
        - **(1) The beatings do not stop**
        - **(2) Beatings become more severe and more frequent**
        - **(3) Beatings occur without provocation whatsoever**
        - **(4) At some point will turn violence toward the children**
      - **d. Characteristics of spouse abusers**
        - **(1) They have low self esteem and are not happy about themselves**
        - **(2) For the most part their violence was learned from their parents**
        - **(3) Some believe they are demonstrating discipline**

- (4) They do not like being out of "control"
- (5) Fail to see any alternatives and do not know what else to do
- (6) Both parties do not know how to back down from conflict
- (7) He/ she may feel powerless to change
- (8) The use of alcohol seems to be a factor
- (9) Mental illness occurs in less than 10% of abusers
- (10) Abuse does occur in all socio-economic groups, however most abusers are in the lower socio-economic groups
- (11) The abuser goes into sudden rages
- (12) Abusers feel insecure and jealous
- (13) The abuser can appear charming and loving after the incident of battering
- (14) The abuser may have money difficulties, problems holding a job and possible legal issues

e. Ten "risk factors" for domestic violence (as taken from "Domestic Violence: Cracking the Code of Silence")

- (1) Male is unemployed
- (2) Male uses illegal drugs at least once a year
- (3) Partners have different religious backgrounds
- (4) Family income is below poverty line
- (5) Partners are unmarried
- (6) Either partner is violent toward children at home
- (7) Male did not graduate from high school
- (8) Male has a blue-collar job, if employed
- (9) Male is between 18-30
- (10) Male saw father hit mother

C. Battered men

1. Overview

a. Battering is not limited to women
b. Men also rarely report incident
c. Humiliation suffered by a woman is multiplied for a man
d. Men feel as trapped as women do
e. Same psychological and emotional effects

- (1) Guilt
- (2) Loss of self-control
- (3) Loss of control

f. Society is less empathetic toward men
g. Even fewer resources exist for men

D. Homosexual relationships

1. Overview

a. Spouse battering occurs in homosexual relationship as well
b. Homosexuals are conditioned the same as heterosexuals

E. Identifying the battered patient

1. Difficult to do because the description of the injuries may be incorrect, inaccurate and protective of the attacker
2. May not seek care for bruises or lacerations
3. May avoid eye contact and be hesitant or evasive about the details of the injuries
4. Clues about the situation

a. "Things haven't been going well lately"
b. "There have been problems at home"

- **F. Approaching the battered patient**
  - **1. Direct questioning is best**
  - **2. Ask if the difficulties led to the physical harm**
  - **3. Convey your awareness that the injuries may be due to their spouse**
    - **a. May feel a sense of relief that someone else is aware**
  - **4. Once the subject has been introduced, show a willingness to discuss it**
    - **a. Remember the following key points for the discussion**
      - **(1) Non-judgmental attitude**
        - **(a) Avoid judgmental statements**
          - **i) "Oh, how awful"**
          - **ii) Avoid "why" questions**
            - **a) "Why don't you leave"**
      - **(2) Supportive attitude**
        - **(a) Listen attentively**
        - **(b) Support and encourage**
      - **(3) Return of control**
        - **(a) Help them to gain control over their life**
        - **(b) Have them identify what they want for themselves and their children**
      - **(4) Community resources**
        - **(a) Community resources vary widely**
        - **(b) Become knowledgeable of the community resources**
    - **b. Safety precautions**
      - **(1) Encourage the patient to take precautions as needed**
      - **(2) What is the quick way out**
        - **(a) Where they can go**
        - **(b) Whom they can call**
- **G. Legal considerations**
  - **1. It is a crime to beat another person**
  - **2. Assault is a misdemeanor or a felony**
    - **a. Depends on amount of injury inflicted and devices used**
  - **3. Attacker may be arrested**
    - **a. May be released within hours on their own recognizance**
    - **b. The patient must be aware of this**
- **H. Victim-witness assistance programs**
  - **1. State and federal funded programs are available**
  - **2. Need to become aware of services available in your area**

- **III. The abused elder**
  - **A. Overview**
    - **1. Prevalent medical and social problem**
    - **2. Factors contributing to the problem**
      - **a. Increased life expectancy**
      - **b. Physical and mental impairment**
      - **c. Decreased productivity**
      - **d. Increased dependence with greater longevity**
      - **e. Limited resources for care of the elderly**
      - **f. Economic factors**
      - **g. Stress of the middle-aged caretaker responsible for two generations**

- **3. Two types of elder abuse**
  - **a. Domestic**
    - **(1) The National Aging Resource Center on Elder Abuse gives the following percentages as to who are the perpetrators of elder abuse in domestic settings**
      - **(a) Adult children 32.5%**
      - **(b) Grandchildren 4.2%**
      - **(c) Spouse 14.4%**
      - **(d) Sibling 2.5%**
      - **(e) Other relatives 12.5%**
      - **(f) Friend/ neighbor 7.5%**
      - **(g) All others 18.2%**
      - **(h) Unknown 2.0%**
    - **(2) Four major theories of causes of domestic elder abuse**
      - **(a) The care giver is stressed-care; giver is ill-equipped to give care (this may be due to personal problems and/ or lack of knowledge of how to do the job)**
      - **(b) Impairment of dependent elders - elders in poor health are morelikely to be abused than those in good health**
      - **(c) Cycle of violence = tension/ crisis/ calm/ repeat cycle**
      - **(d) Personal problems of abusers - abusers of the elderly tend to have more personal problems than do non-abusers**
  - **b. Institutional abuse-perpetrators of institutional abuse usually are persons who have legal or contractual obligation to provide care to elders (e.g., paid caretakers, staff, professionals)**
- **4. Characteristics of elder abuse**
  - **a. More likely to suffer from physical or mental impairment**
  - **b. Abusers are most often the children of the abused person**
  - **c. Elders are most often repeatedly abused by family members**
  - **d. Abused elders do not seek help**
- **5. Forms of abuse**
  - **a. Physical abuse or neglect**
  - **b. Psychological abuse**
  - **c. Violation of individual rights**
    - **(1) Victim of theft**
    - **(2) Loss of freedom of choice**

IV. The abused child

- **A. Overview**
  - **1. Various forms of abuse or neglect**
  - **2. Results in physical or emotional impairment**
  - **3. Involves the mistreatment of children**
    - **a. Occur from infancy to 18 years of age**
    - **b. Involves caretakers**
      - **(1) Parents**
      - **(2) Foster parents**
      - **(3) Stepparents**
      - **(4) Babysitters**

- **4. Neglect**
  - **a. Failure to provide physical care**
    - **(1) Nutrition**
    - **(2) Shelter**
    - **(3) Clothing**
  - **b. Failure to provide emotional care**
    - **(1) Indifference**
    - **(2) Disregard**
  - **c. Importance of identifying the abused child**
    - **(1) Tends to be repetitive**
    - **(2) Repeated calls to the patient's home**

B. Characteristics of abusers

- **1. Overview**
  - **a. Not related to social class, income or level of education**
  - **b. Rigorous discipline accounts for the cyclical nature of abuse**
  - **c. History of severe physical punishment**
  - **d. The abuser was beaten as a child**
  - **e. Abuser would prefer to use other forms of discipline, the stress makes them regress to the earliest patterns**
- **2. Signs of a pre-abuse state**
  - **a. Sometimes the abusive adult will actively seek help**
  - **b. The following pattern may be observed**
    - **(1) Several calls in a 24 hour period**
    - **(2) Frequent calls for inconsequential symptoms**
    - **(3) Parent begins to demonstrate behavior of being unable to handle the impending crisis**
- **3. Characteristics of the child abuser**
  - **a. Immature behavior and is preoccupied with him/ herself**
  - **b. Has little perception of how a child could feel, physically or emotionally**
  - **c. Is critical of the child**
  - **d. Seldom touches or looks at the child**
  - **e. Is unconcerned about the child's injury, treatment, or prognosis**
  - **f. Gives no indication of feeling guilt or remorse**
    - **(1) May blame the child for the injury**
  - **g. Is more concerned about themselves**

C. Characteristics of the abused child

- **1. Overview**
  - **a. The child's behavior offers important clues**
    - **(1) This behavior is age related**
      - **(a) Child under 6 years is excessively passive**
      - **(b) The child over 6 years is aggressive**
  - **b. Child doesn't mind, at any age, if their parent leaves the room**
- **2. Behavior of the abused child**
  - **a. Cries hopelessly during treatment or cries very little in general**
  - **b. Does not look at parents for assurance**
  - **c. May avoid parents**
  - **d. Is wary of physical contact**
  - **e. Is apprehensive**
  - **f. Appears constantly on the alert for danger**
  - **g. May constantly seek favors, food, or things**

- **3. Accidental versus intentional injury**
  - **a. Children very commonly get injured**
  - **b. Not all children with injuries are abused**
  - **c. If the story by the child is volunteered without hesitation and matched that of the parent, child abuse is very unlikely**
  - **d. Distinguishing between an intentional injury and an authentic accident is a challenge**

D. Physical examination

- **1. Overview**
  - **a. The examination is best done with another colleague**
  - **b. The recording of information must be objective**
  - **c. Assumptions and personal perceptions must not be included**
  - **d. The report must be terse and legible**
  - **e. The exam should be performed with kindness and gentleness**
- **2. Common types of soft tissue injuries**
  - **a. Overview**
    - **(1) Soft tissue injuries are the injuries found most frequently in early abuse and may present in a variety of forms**
  - **b. Multiple bruises and ecchymoses**
    - **(1) Look for presence of defense wounds**
    - **(2) Look for injuries on multiple planes of the body**
  - **c. Patterned injuries**
    - **(1) Bites**
    - **(2) Burns**
  - **d. Scalds**
    - **(1) A common form of abuse**
    - **(2) Young and old are particularly susceptible**
- **3. Fractures**
  - **a. Overview**
    - **(1) Second most common injury**
  - **b. Types of fractures**
    - **(1) Twisting injuries**
    - **(2) Jerking injuries**
    - **(3) Rib fractures**
    - **(4) Multiple fractures**
- **4. Head injuries**
  - **a. Overview**
    - **(1) Produce the highest mortality**
    - **(2) Result in greater amount of permanent disability**
    - **(3) Progression of injuries appears to be from the trunk and extremities towards the head**
  - **b. Types of injuries**
    - **(1) Scalp wounds**
    - **(2) Skull fractures**
    - **(3) Subdural or subgaleal hematomas**
    - **(4) Repeated concussions**
- **5. Abdominal injuries**
  - **a. Overview**
    - **(1) A small number of injuries, but serious**
  - **b. Types of injuries**

- (1) Causes rupture of liver, injuries to intestine and mesentery

V. Sexual assault
  - A. Overview
    - 1. Incidence
      - a. Increases annually
      - b. Sexual assault is the more frequently committed offense than abuse
      - c. Victims of abuse and assault may die from their injuries
      - d. Victims may sustain mental or physical injury
      - e. Victims range from 9 months to 90 years of age
      - f. Women alone in isolated areas
  - B. Legal aspect of sexual assault
    - 1. What constitutes rape
      - a. Each state has different interpretation of sexual assault
      - b. Generally, sexual assault refers to sexual contact, whether genital, oral or manual
      - c. Rape is defined as penile penetration of the genitalia (however slight) without consent of the victim
      - d. Rape is a felony crime, based on proof that a crime has occurred
    - 2. Considerations for providing care for a patient who has been sexually assaulted
      - a. Take steps to preserve any evidence
      - b. The patient should not urinate, defecate, douche, bathe
      - c. The patient should not in any way remove evidence from the part of the body that was subjected to sexual contact
      - d. Notify law enforcement as soon as possible
      - e. Remember there will be a "chain of evidence"
      - f. Be aware of local and state requirements for caring for these patients
  - C0 Characteristics of sexual assault
    - 1 Overview
      - a0 Anyone can be a victim
      - b0 Victims are from 9 months to 90 years of age
      - c0 Frequently victims know their assailant
  - D0 Psychosocial aspect of care
    - 1 Initial contact with the patient
      - a0 Non-judgmental attitude
      - b0 Supportive attitude
      - c0 Empathetic, sensitive comments
      - d0 Considerate gestures
        - (1) Covering them
        - (2) Moving from public view
    - 2 Acceptance of behavior
      - a0 Each patient responds differently
      - b0 Anger is especially difficult for most to accept
    - 3 Privacy
      - a0 Avoid further exposure and embarrassment
      - b0 If possible have same sex partner provide care to the patient
    - 4 Returning control
      - a0 Patient must regain as much control of their life as possible
      - b0 Ask open ended questions
        - (1) Would you like to sit on a seat or ride on the stretcher

- (2) Would you like us to contact someone

E0 The child victim

- **1 Overview**
  - **a0** Children who are assaulted usually have frequent contact with their assailant
  - **b0** In a trusted person's home
  - **c0** Usually involves a male assailant and a female victim
  - **d0** Male victims involved in heterosexual relationships are unlikely to report incident
  - **e0** Many children are fondled or physically explored without intercourse
  - **f0** Often the child conceals the sexual activity out of fear
- **2 Assessment considerations**
  - **a0** Symptoms may include behavior or physical manifestations
    - (1) Nightmares
    - (2) Restlessness
    - (3) Withdrawal tendencies
    - (4) Hostility
    - (5) Phobias related to the offender
    - (6) Regression (i.e. bed wetting)
    - (7) Truancy
  - **b0** Emotional impact
    - (1) Adult will create the impression on the child
    - (2) Children will perceive the importance and ramifications of sexual assault through the behavior of the adults around them
- **3 Legal considerations**
  - **a0** If sexual assault is confirmed or suspected, any law that applies must be followed
  - **b0** In some states minors may seek and be treated for sexual assault without parental consent

UNIT TERMINAL OBJECTIVE

6-5 At the completion of this unit the paramedic student will be able to integrate pathophysiological and psychosocial principles to adapt the assessment and treatment plan for diverse patients and those who face physical, mental, social and financial challenges.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

6-5.1 Describe the various etiologies and types of hearing impairments. (C-1)
6-5.2 Recognize the patient with a hearing impairment. (C-1)
6-5.3 Anticipate accommodations that may be needed in order to properly manage the patient with a hearing impairment. (C-3)
6-5.4 Describe the various etiologies of visual impairments. (C-1)
6-5.5 Recognize the patient with a visual impairment. (C-1)
6-5.6 Anticipate accommodations that may be needed in order to properly manage the patient with a visual impairment. (C-3)
6-5.7 Describe the various etiologies and types of speech impairments. (C-1)
6-5.8 Recognize the patient with a speech impairment. (C-1)
6-5.9 Anticipate accommodations that may be needed in order to properly manage the patient with a speech impairment. (C-3)
6-5.10 Describe the various etiologies of obesity. (C-1)
6-5.11 Anticipate accommodations that may be needed it order to properly manage the patient with obesity. (C-3)
6-5.12 Describe paraplegia/ quadriplegia. (C-1)
6-5.13 Anticipate accommodations that may be needed in order to properly manage the patient with paraplegia/ quadriplegia. (C-3)
6-5.14 Define mental illness. (C-1)
6-5.15 Describe the various etiologies of mental illness. (C-1)
6-5.16 Recognize the presenting signs of the various mental illnesses. (C-1)
6-5.17 Anticipate accommodations that may be needed in order to properly manage the patient with a mental illness. (C-3)
6-5.18 Define the term developmentally disabled. (C-1)
6-5.19 Recognize the patient with a developmental disability. (C-1)
6-5.20 Anticipate accommodations that may be needed in order to properly manage the patient with a developmental disability. (C-3)
6-5.21 Describe Down's syndrome. (C-1)
6-5.22 Recognize the patient with Down's syndrome. (C-1)
6-5.23 Anticipate accommodations that may be needed in order to properly manage the patient with Down's syndrome. (C-3)
6-5.24 Describe the various etiologies of emotional impairment. (C-1)
6-5.25 Recognize the patient with an emotional impairment. (C-1)
6-5.26 Anticipate accommodations that may be needed in order to properly manage the patient with an emotional impairment. (C-3)
6-5.27 Define emotional/ mental impairment (EMI). (C-1)
6-5.28 Recognize the patient with an emotional or mental impairment. (C-1)
6-5.29 Anticipate accommodations that may be needed in order to properly manage patients with an emotional or mental impairment. (C-3)
6-5.30 Describe the following diseases/ illnesses: (C-1)
a. Arthritis
b. Cancer

c. Cerebral palsy
d. Cystic fibrosis
e. Multiple sclerosis
f. Muscular dystrophy
g. Myasthenia gravis
h. Poliomyelitis
i. Spina bifida
j. Patients with a previous head injury

6-5.31 Identify the possible presenting sign(s) for the following diseases/ illnesses: (C-1)

a. Arthritis
2. Cancer
3. Cerebral palsy
4. Cystic fibrosis
5. Multiple sclerosis
6. Muscular dystrophy
7. Myasthenia gravis
8. Poliomyelitis
9. Spina bifida
10. Patients with a previous head injury

6-5.32 Anticipate accommodations that may be needed in order to properly manage the following patients: (C-3)

1. Arthritis
2. Cancer
3. Cerebral palsy
4. Cystic fibrosis
5. Multiple sclerosis
6. Muscular dystrophy
7. Myasthenia gravis
8. Poliomyelitis
9. Spina bifida
10. Patients with a previous head injury

6-5.33 Define cultural diversity. (C-1)
6-5.34 Recognize a patient who is culturally diverse. (C-1)
6-5.35 Anticipate accommodations that may be needed in order to properly manage a patient who is culturally diverse. (C-3)
6-5.36 Identify a patient that is terminally ill. (C-1)
6-5.37 Anticipate accommodations that may be needed in order to properly manage a patient who is terminally ill. (C-3)
6-5.38 Identify a patient with a communicable disease. (C-1)
6-5.39 Recognize the presenting signs of a patient with a communicable disease. (C-1)
6-5.40 Anticipate accommodations that may be needed in order to properly manage a patient with a communicable disease. (C-3)
6-5.41 Recognize sign(s) of financial impairments. (C-1)

6-5.42 Anticipate accommodations that may be needed in order to properly manage the patient with a financial impairment. (C-3)

AFFECTIVE OBJECTIVES
None identified for this unit.

PSYCHOMOTOR OBJECTIVES
None identified for this unit.

DECLARATIVE

I. Introduction
   A. Different types of "challenged" patients

II. Physical challenges
   A. Hearing impairments
      1. Types
         a. Conductive deafness
         b. Sensorineural deafness
      2. Etiologies
         a. Conductive deafness (curable)
            (1) Infection
            (2) Injury
            (3) Earwax
         b. Sensorineural deafness (many incurable)
            (1) Congenital
            (2) Birth injury
            (3) Disease
            (4) Medication-induced
            (5) Viral infection
            (6) Tumor
            (7) Prolonged exposure to loud noise
            (8) Aging
      3. Recognition
         a. Hearing aids
         b. Poor diction
         c. Inability to respond to verbal communication in the absence of direct eye contact
      4. Accommodations that may be necessary
         a. Retrieve hearing aid
         b. Paper/ pen
            (1) Many patients with a hearing impairment use American Sign Language (ASL)
            (2) Different syntax than English
         c. Do not shout
            (1) 80% of hearing loss is related to the loss of high-pitched sounds
            (2) Use low-pitched sounds directly into ear canal
         d. Do not exaggerate lip movement
         e. Interpreter
            (1) Notify receiving facility as early as possible

- f. Use of an “amplified” listener (e.g., ear microphone)
- g. Use of picture that illustrate basic needs/ procedures

B. Visual impairments
   1. Etiologies
      - a. Injury
      - b. Disease
      - c. Degeneration of eyeball, optic nerve or nerve pathways
      - d. Congenital
      - e. Infection (C.M.V.)
   2. Recognition
      - a. May be difficult
   3. Accommodations that may be necessary
      - a. Retrieve visual aids
      - b. Describe everything that you're going to do
      - c. Provide sensory information
      - d. If ambulatory, guide by leading, not by pushing
      - e. Allow leader dogs to accompany patient

C. Speech impairments
   1. Types
      - a. Language disorders
      - b. Articulation disorders
      - c. Voice production disorders
      - d. Fluency disorders
   2. Etiologies
      - a. Language disorders
        - (1) Stroke
        - (2) Head injury
        - (3) Brian tumor
        - (4) Delayed development
        - (5) Hearing loss
        - (6) Lack of stimulation
        - (7) Emotional disturbance
      - b. Articulation disorders
        - (1) From damage to nerve pathways passing from brain to muscles in larynx, mouth or lips
        - (2) Delayed development from hearing problems, slow maturation of nervous system
      - c. Voice production disorders
        - (1) Disorder affecting closure of vocal cords
        - (2) Hormonal or psychiatric disturbance
        - (3) Severe hearing loss
      - d. Fluency disorders

- (1) Not fully understood
- 3. Recognition
  - a. Language disorders (aphasia)
    - (1) Slowness to understand speech
    - (2) Slow growth in vocabulary and sentence structure
  - b. Articulation disorders (dysarthria)
    - (1) Speech can be slurred, indistinct, slow, or nasal
  - c. Voice production disorders
    - (1) Hoarseness
    - (2) Harshness
    - (3) Inappropriate pitch
    - (4) Abnormal nasal resonance
  - d. Fluency disorders
    - (1) Stuttering
- 4. Accommodations that may be necessary
  - a. Allow patient time to respond to questions
  - b. Provide aids when available

D. Obesity

- 1. Etiologies
  - a. Caloric intake exceeds calories burned
  - b. Low basal metabolic rate
  - c. Genetic predisposition
- 2. Accommodations that may be necessary
  - a. Obtaining medical history
    - (1) Often extensive medical history
  - b. Assessment
    - (1) Use appropriately sized diagnostic devices
  - c. Management
    - (1) Maintain professionalism
  - d. Transport
    - (1) May require additional assistance

E. Patients with paraplegia/ quadriplegia

- 1. Description
  - a. Paraplegia
    - (1) Weakness or paralysis of both legs
  - b. Quadriplegia
    - (1) Paralysis of all four extremities and the trunk
- 2.2 Accommodations that may be necessary
  - a. Assessment
    - (1) May require airway management
      - (a) Patients with halo traction device
    - (2) Observe for ostomies

- (a) Trachea
- (b) Bladder
- (c) Colon

(3) Priapism may be present

b. Transport

(1) May require additional assistance/ equipment

F. Other physically challenged patients

III. Mental challenges

A. Mental illness

1. Description

a. Any form of psychiatric disorder

2. Etiologies

a. Psychoses

(1) Caused by complex biochemical brain disease

b. Neuroses

(1) Disease related to personality

3. Recognition

a. Behavior may be unaffected

b. May present with signs and symptoms consistent with illness

4. Accommodations that may be necessary

a. Obtaining history

(1) Don't be afraid to ask about

- (a) History of mental illness
- (b) Prescribed medications
- (c) Whether patient is taking medications as prescribed
- (d) Concomitant ingestion of alcohol, other drugs

b. Assessment

(1) Be sure to solicit permission before beginning

c. Management

(1) Treat as you would any patient that does not have a mental illness, unless call is related specifically to the mental illness; patients with mental illness also experience myocardial infarctions, hypoglycemic episodes, and dislocated shoulders

B. Developmental disabilities

1. Description/ etiologies

a. Impaired/ insufficient development of the brain, causing an inability to learn at the usual rate

2. Recognition

a. History

3. Accommodations that may be necessary

- a. Obtaining history
- b. Assessment
- c. Management
- d. Transport

4. Down's syndrome
   - a. Description/ etiologies
     - (1) A chromosomal abnormality resulting in mild to severe mental retardation, and a characteristic physical appearance
   - b. Recognition (typical)
     - (1) Eyes slope up at outer corners; folds of skin on either side of nose cover the inner corners of eye
     - (2) Small face and features
     - (3) Large and protruding tongue
     - (4) Flattening on back of the head
     - (5) Hands short and broad
   - c. Accommodations that may be necessary
     - (1) Obtaining history, consider
       - (a) Approximately 25% have a heart defect at birth
       - (b) IQ varies from 30-80
     - (2) Assessment
     - (3) Management
     - (4) Transport

C0 Emotional impairments
- 1 Description/ etiologies
  - a0 Neurasthenia
  - b0 Anxiety neurosis
  - c0 Compulsion neurosis
  - d0 Hysteria
- 2 Recognition
  - a0 History
- 3 Accommodations that may be necessary
  - a0 Obtaining history
  - b0 Assessment
  - c0 Management
  - d0 Transport

D0 Emotional/ mental impairments (EMI)
- 1 Description/ etiologies
- 2 Recognition
  - a0 History
- 3 Accommodations that may be necessary
  - a0 Obtaining history
  - b0 Assessment

- c0 Management
- d0 Transport

IV Pathological challenges
- A0 Arthritis
  - 1 Description
    - a0 Inflammation of a joint; characterized by pain, stiffness, swelling, redness
  - 2 Types/ etiologies
  - 3 Accommodations that may be necessary
    - a0 Assessment
      - (1) Decreased range of motion/ mobility may limit physical exam
      - (2) Be sure to solicit current medications before considering the administration of medications
    - b0 Management/ transport
      - (1) Limited ability to be mobile
      - (2) Make equipment fit patient, not vice-versa; pad all voids
- B0 Cancer (malignant tumor)
  - 1 Description/ etiologies
    - a0 Various; dependent on primary site
  - 2 Recognition
    - a0 Various; dependent on primary site
  - 3 Accommodations that may be necessary
    - a0 Obtaining history
    - b0 Assessment
      - (1) Look for transdermal pain medication on skin
    - c0 Management
      - (1) Mediport access
    - d0 Transport
- C0 Cerebral palsy
  - 1 Description
    - a0 Nonprogressive disorders of movement and posture
  - 2 Types
    - a0 Spastic paralysis
      - (1) Abnormal stiffness and contraction of groups of muscles
    - b0 Athetosis
      - (1) Involuntary, writhing movements
    - c0 Ataxia
      - (1) Loss of coordination and balance
  - 3 Etiologies
    - a0 Most occur before birth
    - b0 Prepartum

(1) Cerebral hypoxia
(2) Maternal infection
(3) Kernicterus

c0 Postpartum
(1) Encephalitis
(2) Meningitis
(3) Head injury

4 Recognition
a0 Spastic
(1) Muscles of one or more extremities are permanently contracted

b0 Athetoid
(1) Involuntary writhing movement

c0 Quadriplegia
d0 Mental retardation in about 75% of all people with CP
e0 Many people with athetoid and diplegic cerebral palsy are highly intelligent

5 Accommodations that may be necessary
a0 Transport
(1) May require additional resources to facilitate transport
(2) May need suctioning, due to increased oral secretions
(3) If contractures are present, pad appropriately; do not force extremities to move

D0 Cystic fibrosis (Mucoviscidosis)
1 Description
a0 An inherited metabolic disease of the lungs and digestive system, manifesting itself in childhood

2 Etiology
a0 A defective, recessive gene

3 Recognition
a0 History
b0 Patient may be oxygen-dependent
c0 Salty taste on skin
d0 Productive cough

4 Accommodations that may be necessary
a0 Management
(1) May require respiratory support, suctioning, oxygen

E0 Multiple sclerosis
1 Description
a0 A progressive autoimmune disease of the CNS, whereby scattered patches of myelin in the brain and spinal cord are destroyed

2 Etiologies

- a0 Unknown
- 3 Recognition
  - a0 If brain is affected
    - (1) Fatigue
    - (2) Vertigo
    - (3) Clumsiness
    - (4) Muscle weakness
    - (5) Slurred speech
    - (6) Ataxia
    - (7) Blurred or double vision
    - (8) Numbness, weakness or pain in the face
  - b0 If spinal cord is affected
    - (1) Tingling, numbness, or feeling of constriction in any part of the body
    - (2) Extremities may feel heavy and become weak
    - (3) Spasticity may be present
- 4 Accommodations that may be necessary
  - a0 Assessment
    - (1) Recognize characteristic presentations
    - (2) May be accompanied by
      - (a) Painful muscle spasms
      - (b) UTI
      - (c) Constipation
      - (d) Skin ulcerations
      - (e) Changes of mood, from euphoria to depression
  - b0 Management
    - (1) Possible respiratory support
  - c0 Transport
    - (1) Patient should not be expected to ambulate

F0 Muscular dystrophy

- 1 Description
  - a0 An inherited muscle disorder of unknown cause in which there is slow but progressive degeneration of muscle fibers
- 2 Recognition
  - a0 History
  - b0 Little or no movement of muscle groups
- 3 Accommodations that may be necessary
  - a0 Management
    - (1) Possible respiratory support
  - b0 Transport
    - (1) Patient should not be expected to ambulate

G0 Poliomyelitis

- 1 Description/ etiologies
  - a0 Caused by a virus, which usually results in a mild illness
  - b0 In more serious cases, it attacks the CNS; may result in paralysis or death
- 2 Recognition
  - a0 History
  - b0 Patients with severe polio may present with paralysis (including respiratory)
- 3 Accommodations that may be necessary
  - a0 Management
    - (1) If lower extremities are paralyzed, patient may require catheterization
    - (2) If respiratory paralysis, patient may require tracheostomy
  - b0 Transport
    - (1) Patient should not be expected to ambulate

H0 Patients with previous head injuries

- 1 Recognition
  - a0 Physical appearance may be uncharacteristic
  - b0 Speech and mobility may be affected
  - c0 Short term memory loss
- 2 Accommodations that may be necessary
  - a0 Obtaining history
  - b0 Assessment
  - c0 Management
  - d0 Transport

I0 Spina bifida

- 1 Description
  - a0 A congenital defect in which part of one or more vertebrae fails to develop, leaving a portion of the spinal cord exposed
- 2 Etiology
  - a0 Unknown
- 3 Recognition
  - a0 History
- 4 Accommodations that may be necessary
  - a0 Management/ transport
    - (1) Patient should not be expected to ambulate, although most can

J0 Myasthenia gravis

- 1 Description
  - a0 A disorder in which muscles become weak and tire easily
  - b0 Eyes, face, throat, and extremity muscles most commonly affected
- 2 Etiology

- a0 Autoimmune disorder of unknown etiology
- 3 Recognition
  - a0 Drooping eyelids, double vision
  - b0 Difficulty speaking
  - c0 Chewing, swallowing may be difficult
  - d0 Movement of extremities may be difficult
  - e0 Respiratory muscles may be weakened
- 4 Accommodations that may be necessary
  - a0 Assessment/ management
    - (1) History
    - (2) Accommodations vary, based upon presentation

V Culturally diverse patients
- A0 Variables
  - 1 Ethnicity, religion, gender, homelessness, etc. may dictate various accepted medical practices
    - a0 May conflict with learned medical practice of the paramedic
  - 2 Patients who speak a language other than English have unique challenges
- B0 Recognition
- C0 Accommodations that may be necessary
  - 1 Assessment/ management/ transport
    - a0 Be sure to obtain permission to treat when possible
    - b0 Attempt to recruit an interpreter, or consider translator device (e.g. AT&T language line) for non-English speaking patients; notify receiving facility as soon as possible if an interpreter will be needed

VI Terminally ill patients
- A0 Variables
- B0 Accommodations
  - 1 Obtaining history
    - a0 Advance directives, DNR
  - 2 Assessment
    - a0 Pain assessment (transdermal delivery of pain medications) - quantify and qualify
    - b0 Management
    - c0 Transport

VII Patients with communicable diseases
- A0 Review of etiologies
- B0 Accommodations
  - 1 Obtaining history
  - 2 Assessment

- 3 Management
  - a0 Precautions will depend upon modes of transmission
- 4 Transport

VIII Financial challenges
- A0 Description
  - 1 May be apprehensive about seeking medical care
- B0 Accommodations
  - 1 Management
  - 2 Transport

UNIT TERMINAL OBJECTIVE

6-6 At the completion of this unit, the paramedic student will be able to integrate the pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the acute deterioration of a chronic care patient.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

6-6.1 Compare and contrast the primary objectives of the ALS professional and the home care professional. (C-3)
6-6.2 Identify the importance of home health care medicine as related to the ALS level of care. (C-1)
6-6.3 Differentiate between the role of EMS provider and the role of the home care provider. (C-3)
6-6.4 Compare and contrast the primary objectives of acute care, home care and hospice care. (C-3)
6-6.5 Summarize the types of home health care available in your area and the services provided. (C-3)
6-6.6 Discuss the aspects of home care that result in enhanced quality of care for a given patient. (C-1)
6-6.7 Discuss the aspects of home care that have a potential to become a detriment to the quality of care for a given patient. (C-1)
6-6.8 List complications commonly seen in the home care patients which result in their hospitalization. (C-1)
6-6.9 Compare the cost, mortality and quality of care for a given patient in the hospital versus the home care setting. (C-3)
6-6.10 Discuss the significance of palliative care programs as related to a patient in a home health care setting. (C-1)
6-6.11 Define hospice care, comfort care and DNR/ DNAR as they relate to local practice, law and policy. (C-1)
6-6.12 List the stages of the grief process and relate them to an individual in hospice care. (C-1)
6-6.13 List pathologies and complications typical to home care patients. (C-1)
6-6.14 Given a home care scenario, predict complications requiring ALS intervention. (C-3)
6-6.15 Given a series of home care scenarios, determine which patients should receive follow-up home care and which should be transported to an emergency care facility. (C-3)
6-6.16 Describe airway maintenance devices typically found in the home care environment. (C-1)
6-6.17 Describe devices that provide or enhance alveolar ventilation in the home care setting. (C-1)
6-6.18 List modes of artificial ventilation and an out-of-hospital situation where each might be employed. (C-1)
6-6.19 List vascular access devices found in the home care setting. (C-1)
6-6.20 Recognize standard central venous access devices utilized in home health care. (C-1)
6-6.21 Describe the basic universal characteristics of central venous catheters. (C-1)
6-6.22 Describe the basic universal characteristics of implantable injection devices. (C-1)
6-6.23 List devices found in the home care setting that are used to empty, irrigate or deliver nutrition or medication to the GI/ GU tract. (C-1)
6-6.24 Describe complications of assessing each of the airway, vascular access, and GI/ GU devices described above. (C-1)
6-6.25 Given a series of scenarios, demonstrate the appropriate ALS interventions. (C-3)
6-6.26 Given a series of scenarios, demonstrate interaction and support with the family members/ support persons for a patient who has died. (C-3)
6-6.27 Describe common complications with central venous access and implantable drug administration ports in the out-of-hospital setting. (C-1)
6-6.28 Describe the indications and contraindications for urinary catheter insertion in an out-of-hospital setting. (C-1)
6-6.29 Identify the proper anatomy for placement of urinary catheters in males or females. (C-2)
6-6.30 Identify failure of GI/ GU devices found in the home care setting. (C-2)

6-6.31 Identify failure of ventilatory devices found in the home care setting. (C-2)
6-6.32 Identify failure of vascular access devices found in the home care setting. (C-2)
6-6.33 Identify failure of drains. (C-2)
6-6.34 Differentiate between home care and acute care as preferable situations for a given patient scenario. (C-3)
6-6.35 Discuss the relationship between local home care treatment protocols/ SOPs and local EMS Protocols/ SOPs. (C-3)
6-6.36 Discuss differences in individuals ability to accept and cope with their own impending death. (C-3)
6-6.37 Discuss the rights of the terminally ill. (C-1)

AFFECTIVE OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

6-6.38 Value the role of the home-care professional and understand their role in patient care along the life-span continuum. (A-2)
6-6.39 Value the patient's desire to remain in the home setting. (A-2)
6-6.40 Value the patient's desire to accept or deny hospice care. (A-2)
6-6.41 Value the uses of long term venous access in the home health setting, including but not limited to: (A-2)
- **a. Chemotherapy**
- **b. Home pain management**
- **c. Nutrition therapy**
- **d. Congestive heart therapy**
- **e. Antibiotic therapy**

PSYCHOMOTOR OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

6-6.42 Observe for an infected or otherwise complicated venous access point. (P-1)
6-6.43 Demonstrate proper tracheotomy care. (P-1)
6-6.44 Demonstrate the insertion of a new inner cannula and/ or the use of an endotracheal tube to temporarily maintain an airway in a tracheostomy patient. (P-1)
6-6.45 Demonstrate proper technique for drawing blood from a central venous line. (P-1)
6-6.46 Demonstrate the method of accessing vascular access devices found in the home health care setting. (P-1)

DECLARATIVE

- **I. Introduction**
  - **A. Epidemiology of home care**
    - **1. Patients receiving home care**
      - **a. Supportive statistics**
    - **2. ALS responses to home care patients**
      - **a. Role of the ALS provider**
      - **b. Role of the home care provider**
      - **c. Supportive statistics**
      - **d. Typical responses**
        - **(1) Respiratory failure**
        - **(2) Cardiac decompensation**
        - **(3) Septic complications**
        - **(4) Equipment malfunction**
        - **(5) Other medical pathologies exacerbated in the home care setting**
    - **3. Medical devices commonly found in the home care setting**
      - **a. Supportive statistics**
        - **(1) National (number of trach patients, home ventilator patients, etc.)**
        - **(2) Local**
      - **b. Examples of home care problems requiring intervention by a home health practitioner of physician**
        - **(1) Chemotherapy**
        - **(2) Pain management**
        - **(3) Hospice care**
        - **(4) Others**
      - **c. Examples of home care problems requiring acute intervention**
        - **(1) Inadequate respiratory support**
        - **(2) Acute respiratory events**
        - **(3) Acute cardiac events**
        - **(4) Acute sepsis**
        - **(5) GI/ GU crisis**
    - **4. Injury control and prevention in the home care setting**
      - **a. Haddon's matrix**
      - **b. Performance versus task demand**
      - **c. Infection control in the home care setting**
  - **B. Types of home care patients**
    - **1. Airway pathologies**
      - **a. Inadequate pulmonary toilet**
      - **b. Inadequate alveolar ventilation**
      - **c. Inadequate alveolar oxygenation**
    - **2. Circulatory pathologies**
      - **a. Alterations in peripheral circulation**
    - **3. GI/ GU pathologies**
      - **a. Ostomies**
      - **b. Catheters**
      - **c. Home dialysis**
    - **4. Infections**
      - **a. Cellulitis**

- b. Sepsis
- 5. Wound care
  - a. Surgical wound closure
  - b. Decubitus wounds
  - c. Drains
- 6. Hospice care
- 7. Maternal/ child care
  - a. Apnea monitors
  - b. The new parent
- 8. Progressive dementia in the patient at home
- 9. Psychosocial support of the home care family
- 10. Chronic pain management
- 11. Home chemotherapy
- 12. The transplant candidate

II. General system pathophysiology, assessment and management
- A. Assessment
  - 1. Scene size-up
    - a. Body substance isolation
      - (1) Infectious waste issues in the home care environment
    - b. Scene safety
      - (1) Pets
      - (2) Firearms and other home protection devices
      - (3) Home hazards
    - c. Milieu
      - (1) Ability to maintain a healthy environment
      - (2) Adequate nutritional support available
      - (3) Adequate basic needs (heat, electricity, etc.)
  - 2. Initial assessment
  - 3. Focused history and physical examination
    - a. Critical findings
      - (1) Rapid assessment and transport
      - (2) Detailed assessment
      - (3) On-going assessment
    - b. Non-critical findings
      - (1) Focused history and physical examination
        - (a) Medication interactions in home care
        - (b) Using the available home health history
        - (c) Accessing the home health history
        - (d) Compliance issues
        - (e) Assessing dementia
      - (2) Other intervention and transport considerations
        - (a) Notification of family or caretakers
        - (b) Securing the home
  - 4. On-going assessment
  - 5. Comprehensive assessment
    - a. Inspection
    - b. Palpation
    - c. Auscultation

- 6. Differential diagnosis and continued management
- B. Management/ treatment plan
  - 1. Replacing home health treatment modalities with ALS modalities
    - a. Airway and ventilatory support
    - b. Circulatory support
    - c. Pharmacological intervention
    - d. Non-pharmacologic interventions
    - e. Transport considerations
      - (1) Home care follow-up
      - (2) Referral to other public service agencies
      - (3) Notification of family medical doctor or home health agencies

III. Specific acute home health situations
- A. Inadequate respiratory support
  - 1. Supportive statistics
    - a. Home oxygen
    - b. COPD patients
    - c. Home ventilation patients
  - 2. Review of specific anatomy and physiology
    - a. Respiratory anatomy and physiology as it relates to
      - (1) CPAP
      - (2) Positive pressure ventilation
  - 3. Review pathophysiology
    - a. Increased risk of airway infections in the respiratory compromised patient
    - b. Progression of chronic respiratory diseases
    - c. Chronic pathologies requiring home respiratory support
      - (1) COPD
      - (2) Bronchopulmonary dysplasia
      - (3) Patients awaiting lung transplant
      - (4) Cystic fibrosis
      - (5) Sleep apnea
    - d. Increased respiratory demand making current support inadequate
      - (1) Respiratory infections
      - (2) Other factors affecting respiratory demand
    - e. Increased secretions
    - f. Obstructed or malfunctioning airway devices
    - g. Improper application of medical device
  - 4. Medical therapy found in the home setting
    - a. Home oxygen therapy
      - (1) Oxygen concentrators
      - (2) Oxygen in cylinders
      - (3) Liquid oxygen systems
    - b. CPAP
      - (1) Mask CPAP
      - (2) Nasal CPAP
      - (3) BiPAP
    - c. Artificial airways
      - (1) Tracheotomies

- d. Home ventilation
  - (1) Volume ventilators
  - (2) Pressure ventilators
  - (3) Negative pressure ventilation devices (poncho ventilators)

5. Assessment findings
   - a. Work of breathing
   - b. Tidal volume
   - c. Peak flow
   - d. Oxygen saturation
   - e. Breath sounds

6. Management
   - a. Improving airway patency
     - (1) Repositioning airway devices
     - (2) Removing secretions from airway devices
     - (3) Replacing a home airway device with an ALS device
       - (a) ET tube replacing trach tube
   - b. Improving ventilation
     - (1) Removing from a home care device and using positive pressure ventilation
     - (2) Adjusting home care devices fit or settings to improve ventilations
   - c. Improving oxygenation
     - (1) Replacing oxygen delivery devices
     - (2) Changing the flow rate of oxygen delivery devices
   - d. Transport considerations
   - e. Psychological support/ communication strategies
     - (1) Communication with the intubated patient
     - (2) Communication using a "talking trach"

B. Acute cardiovascular and vascular access

1. Epidemiology
   - a. Supportive statistics
     - (1) Types and numbers of central venous access devices found in the home
     - (2) Types and numbers of dialysis patients found in the home

2. Review of specific anatomy and physiology
   - a. Cardiovascular anatomy and physiology as it relates to
     - (1) Central venous access
     - (2) Dialysis shunts
     - (3) Peripheral circulation
     - (4) Cardiovascular decompensation

3. Review pathophysiology
   - a. Cardiomyopathy
   - b. Post MI cardiac insufficiency
   - c. Anticoagulation associated with percutaneous or implanted devices
   - d. Embolus formation associated with indwelling devices, stasis and inactivity
   - e. Air embolus associated with central venous access devices
   - f. Obstructed or malfunctioning vascular access devices
   - g. Infected access site
   - h. Obstructed dialysis shunts

- **4. Medical therapy found in the home setting**
  - **a. Vascular access devices**
    - **(1) Surgically implanted medication delivery devices (Mediports, etc.)**
    - **(2) Peripheral vascular access devices (PICC, Intracath, etc.)**
    - **(3) Central vascular access devices (Hickman, Groshon, etc.)**
  - **b. Dialysis shunts**
  - **c. Hemodynamic support**
  - **d. Anticoagulant therapy**
- **5. Assessment findings**
  - **a. Infection**
  - **b. Hemodynamic compromise**
  - **c. Hemorrhage**
  - **d. Embolus**
    - **(1) Air**
    - **(2) Thrombus**
    - **(3) Plastic or catheter tip**
  - **e. Stable versus unstable angina**

C. GI/ GU crisis

- **1. Epidemiology**
  - **a0 Supportive statistics referencing numbers of devices in the out-of-hospital setting**
    - **(1) Urinary catheters or urostomies**
    - **(2) Benign prostetic hypertrophy**
    - **(3) Indwelling nutritional support device (peg tube, G-tube)**
    - **(4) Colostomies**
    - **(5) NG tubes**
- **2 Review of specific anatomy and physiology**
  - **a0 GI/ GU anatomy and physiology as it relates to**
    - **(1) Urinary tract infections and urosepsis**
    - **(2) Bowel obstruction**
    - **(3) Aspiration of gastric contents**
- **3 Review pathophysiology**
  - **a0 Urosepsis**
  - **b0 Urinary retention**
  - **c0 Aspiration of gastric contents secondary to**
    - **(1) Non-patent gastric tube**
    - **(2) Improper nutritional support via feeding tube**
    - **(3) Patient positioning with the above devices**
  - **d0 Bowel obstruction in the patient with gastric devices**
  - **e0 Obstructed or malfunctioning gastric devices**
- **4 Medical therapy found in the home setting**
  - **a0 Urinary tract**
    - **(1) External urinary catheters**
    - **(2) Indwelling urinary catheters**
    - **(3) Suprapubic catheters**
    - **(4) Urostomy**
  - **b0 Gastric emptying or feeding**
    - **(1) NG tubes**
    - **(2) Feeding tubes**

- (3) Peg tubes, J tubes, etc.
- (4) Colostomy

5 Assessment findings
- a0 Abdominal pain
- b0 Distention
- c0 Bowel sounds
- d0 Palpation of bladder
- e0 Color/ character/ amount of urine

6 Management
- a0 Aspiration
- b0 Urinary retention
  - (1) Hypotension
  - (2) Catheterization
- c0 Bowel obstruction
- d0 Dysfunctional device
- e0 Transport considerations
  - (1) Positioning
  - (2) Positioning of devices for proper drainage and prevention of reflux

D0 Acute infections

1 Epidemiology
- a0 Supportive statistics
  - (1) Mortality rates from sepsis and severe peripheral infections
  - (2) Increased rate of infections in the elderly, chronically ill and homebound
  - (3) Decreased ability to perceive pain or perform self-care in many homebound populations

2 Review of specific anatomy and physiology
- a0 Immune system
- b0 Normal wound healing

3 Review pathophysiology
- a0 Increased risk of airway infections in the immunocompromised patient
- b0 Poor peripheral perfusion results in decreased healing and increased peripheral infections
- c0 Sedentary existence leads to skin breakdown and peripheral infections
- d0 Percutaneous and implanted medical devices increase risk for infections and sepsis
- e0 Patients discharged to home with open wounds and incisions
- f0 Chronic diseases may further impair healing
- g0 Poor nutrition, hygiene or ability to care for self impact infection rates
- h0 Abscesses
- i0 Cellulitis

4 Medical therapy found in the home setting
- a0 Open wounds
  - (1) Dressings
  - (2) Wound packing
  - (3) Drainage
- b0 Drains found in wounds
  - (1) Penrose drains
  - (2) Jackson-Pratt drains

- (3) Others
- c0 Wound closure techniques
  - (1) Sutures
  - (2) Wires
  - (3) Staples
  - (4) Others
- 5 Assessment findings
  - a0 Signs of healthy wound healing
  - b0 Signs of superficial infections
  - c0 Signs of major infections
  - d0 Signs of sepsis
- 6 Management
  - a0 Sterile dressing (redressing) after wound evaluation
  - b0 Transport considerations
  - c0 Psychological support/ communication strategies

E0 Maternal/ child

- 1 Epidemiology
  - a0 Supportive statistics
    - (1) Birth rates and average length of hospitalization
    - (2) Rates for post partum bleeding
    - (3) Rates for infant septicemia
- 2 Review of specific anatomy and physiology
  - a0 Childbirth and post partum changes
  - b0 Newborn pathophysiology as it relates to
    - (1) Thermoregulation
    - (2) Respiratory drive
    - (3) Immune response
- 3 Review pathophysiology
  - a0 Infantile apnea
    - (1) Review apnea monitoring
  - b0 Septicemia in the newborn
  - c0 Other newborn pathophysiologies
  - d0 Post partum hemorrhage
  - e0 Post partum depression
  - f0 Other post partum pathophysiologies
    - (1) Sepsis
    - (2) Pulmonary embolus
- 4 Assessment findings
  - a0 Signs of sepsis
  - b0 Failure to thrive
  - c0 The well-baby exam
  - d0 Post partum assessment
- 5 Management
  - a0 Transport considerations
  - b0 Psychological support/ communication strategies

F0 Hospice/ comfort care

- 1 Epidemiology
  - a0 Supportive statistics
    - (1) Hospice care statistics

- **2 Review of specific terms**
  - **a0 Palliative care**
  - **b0 Comfort care**
  - **c0 Hospice care**
  - **d0 DNR/ DNAR**
  - **e0 Durable power of attorney**
- **3 Review material**
  - **a0 The grief response**
  - **b0 Local DNR or related legislation**
  - **c0 Medical direction considerations**
- **4 Medical therapy found in the home setting**
  - **a0 Pain control in the terminal patient**
    - **(1) Therapy for overmedication**
- **5 Management**
  - **a0 Transport considerations**
  - **b0 Psychological support/ communication strategies**